AN OPEN CLINICAL STUDY ON "*PAANDU NOI*" (IRON DEFICIENCY ANAEMIA) IN CHILDREN WITH THE EVALUATION OF SIDDHA DRUG *CHITRAMUTTI NEI*

The Dissertation Submitted By

Reg. no.321414103

Under the Guidance of

Dr. C.SHANMUGAPRIYA. M.D(S)

Dissertation submitted to

THE TAMILNADU Dr. M. G. R MEDICAL UNIVERSITY

Chennai – 600032

In partial fulfilment of the requirements

for the award of the degree of

DOCTOR OF MEDICINE (SIDDHA)

(BRANCH – IV *KUZHANTHAI MARUTHUVAM*)

POST GRADUATE DEPARTMENT OF *KUZHANTHAI MARUTHUVAM*

Government Siddha Medical College,

Chennai – 600106

October – 2017

CERTIFICATE

This is to certify that the dissertation entitled **"AN OPEN CLINICAL STUDY ON *PAANDU NOI*"** is a bonafide work done by **Dr. G.G.KALAISELVI**, Government Siddha Medical College, Chennai – 600 106 in partial fulfillment of the University rules and regulations for award of **SIDDHA MARUTHUVA PERARIGNAR** under my guidance and supervision during the academic year 2014 – 2017.

Name & Signature of the Guide

Name & Signature of the Head of Department

Name & Signature of the Dean/ Principal

ACKNOWLEDGEMENT

My humble thanks to the Almighty God, for giving me the opportunity to do this dissertation. I also express my thanks to Siddhars, who blessed and guided me in all my efforts, to complete this dissertation.

I express my sincere thanks to respected **Principal Prof.Dr.K. Kanakavalli, M.D(s), Government Siddha Medical College**, **Chennai – 106**.

I express my sense of gratitude to the respected Guide **Dr. C. SHANMUGAPRIYA M.D(s)**, **Lecturer II, Post Graduate**, **Department of Kuzhanthai Maruthuvam**, **Government Siddha Medical College,Chennai-106**, for granting permission to undertake a study in the dissertation topic and providing all basic facilities in this dissertation topic and the moral support, valuable guidance and encouragement to finish this dissertation work.

I express my sincere thanks to **Dr.R.Meenakumari. M.D(s)**, **Head of the Department, Government Siddha Medical College**, **Chennai-106** for her guidance and moral support.

I wish to thank **Dr.S.Gandhimathi. M.D(s)** and **Dr. N. Manju Hemamalini M.D(s)**, **Government Siddha Medical College**, **Chennai**,**-106** for their useful support during this study.

I wish to thank **Mr.S.Selvaraj**, **M.sc Biochemistry**, **Government Siddha Medical College**, **Chennai-106** for his guidance and helping me to do the biochemical analysis of trial drug during study.

I wish to thank **Dr. D. Sivaraman**, **M.Pharm**, **PhD, Sathyabama University**, **Sirucheery, Chennai – 97**, for giving **IAEC** approval and helping me to finish toxicity study and activity study.

I wish to thank **Sasikala Ethirajalu, Consultant (Pharmacognosy), SCRI, Chennai – 106**, for his guidance giving drug authentication.

I wish to thank **Dr.S.Sathya Rajeshwaran**, **M.D(s)**, **SCRI, Chennai – 106**, for his guidance and helping me to complete **IEC**, valuable guidance and encouragement to finish this dissertation work.

I thank Librarian **Mr.V.Dhandayuthapani, M.Com, M.L is,** Dr.Ambedkar Library, GSMC, Chennai-106.

I wish to thank **Dr.M.Manivasagam B.S.M.S**, **M.sc Epidemiology** for helping to do Bio-stastical analysis.

I express my sincere thanks to all other Teaching Staffs in **Government SiddhaMedical College**, **Chennai– 106**.

I express my gratitude to all my patients and their parents, for their willingly accepting themselves for this study.

My special thanks goes to my husband, family members and my beloved friends, for their encouragement and support in completing the dissertation.

CONTENTS

INTRODUCTION

Siddha system of medicine is one of the oldest systems of medicine practiced in South India especially in Tamil Nadu. It is a traditional system of medicine which is gradually evolved along with the Dravidians culture and hence this system is known as Dravidian system of medicine.

The term ***'Siddha'*** means achievements and *Siddhars* were saintly persons who achieved results in medicine. The *Siddhars* were great scientist in ancient times. Eighteen *Siddhars* were said to have contributed towards the development of this medical system.

According to tradition, the origin of Siddha system of medicine is attributed to the great *Siddha Agasthiyar,*

There are certain diseases that can be cured. Some diseases, that can only be managed. But it always best that they can be prevented.

"மறுப்ப துடல் நோய் மருந்தென லாகும்
மறுப்ப துள நோய் மருந்தென சாலும்
மறுப்ப தினி நோய் வாரா திருப்ப
மறுப்பது சாவை மருந்தென லாமே."

-திருமந்திரம்

The *Siddha System* of Medicine emphasizes that medical treatment is oriented not merely to disease but also it has to be taken into account the patient's physical condition, environments, physiological constitution etc. This means the treatment has to be individualistic and tailor-made which ensures that mistakes in diagnosis or treatment are minimal.

This system is mainly based on *'Andapinda Thathuvam''Panchaboothas'*. The structural aspect of human body is said to be *'Udal Thathus'* (ie. The physical component of the human body) and the functional units of the human body is said to be*'Uyir Thathus'* or Three humours (the physiological unit ie., *Vatham, Pitham,*

Kapham). Functional cooperation of these two are essential for the maintainence of health.

Even though the treatment is based upon '*Thridosha theory*' the diagnosis is based upon *'Envagai thervu'* which includes *Naa, Niram, Mozhi, Vizhi, Malam, Moothiram, Naadi* and *Sparism.*

Health is considered as the maintance of equilibrium between the three humours and the diseases are imbalance among them. Some preventive measures are also clearly mentioned in siddha system. Among these diet plays a major role.

Siddhar classified 4,448 types of disease. Within that ***Paandu Noi*** or ***Veluppu Noi*** is one of the diseases commonly affecting women and young children.

In our country Nutritional Iron Deficiency is the most common cause of anaemia. '**Iron Deficiency Anaemia'(IDA)** is a very common disease prevalent in the society. Long term oral iron therapy is commonly used as first line therapy but iron salts such as ferrous sulphate are associated with a high incidence of gastrointestinal side effects such as nausea, vomiting, diarrhoea or constipation. Because of their adverse effects, a safe, effective, cheap, and easily available drug is needed. Many drugs are available in Siddha system of medicine which have remarkable effects in treating anaemia. One such medicine is ***Chitramutti Nei*** indicated for anaemia mentioned in Siddha classical literature. It is also indicated for fever, jaundice and dropsy.Medicine is in the form ghee, it act as demulcent,have high nutritive value and helpful in absorption of iron and gainig weight in children.

With the aim of that, this Poly Herbal preparation may be effective to manage childhood IDA without any synergistic effects. The present study was carried out to study the efficacy and safety of the Siddha poly herbal compound ***Chitramutti Nei*** with the application of modern parameters.

AIM AND OBJECTIVES

AIM:

The aim of this study on ***'Paandu Noi'*** is to ensure a new approach for diagnosis and to find out a safe and effective remedy.

'*Paandu Noi'* is an important Haematological entity described in Siddha literatures. It is essential to find out a simple drug to overcome this disease. The drug should be easily available, economic, easily administered and also effective in smaller doses. ***Chitramutti Nei*** possess all the above characters. This is the reason for selecting this drug.

OBJECTIVES:

1. To collect the literature of both Siddha and Modern aspects of the disease *Paandu Noi*.

2. To have an idea about the prevalence of *Paandu Noi* with reference to age, sex, socio –economic status, poverty, seasonal variations etc.

3. To know the aetiology, classification, symptoms, diagonostic methods and line of treatment compared with Iron Deficiency Anaemia.

4. To know the alteration of the disease under the topics Mukkutram, Udal Kattukal, Poripulangal, Envagai Thervukal, Neerkuri, Neikuri.

5. To make a clinical trial on patients with the trial medicine *Chitramutti Nei* in the treatment of *' Paandu Noi'.*

6. To make use of Modern parameters in the investigation side to confirm the diagnosis and to follow the progress of the patients.

7. To elicit Biochemical analysis and Toxicological analysis Pharmacological action of the trial medicine.

8. To make an awareness among the parents about the prevention of disease in children.

REVIEW OF LITERATURE

SIDDHA ASPECTS

PAANDU NOI

The Siddha system of medicine is not only showing interest in the art of healing but, also given importance to the art of living.

This disease "*Paandu Noi*" is as old as the evening star. *'Paandu'* has its historical importance. The word "***Paandu Noi***" has been derived from***"Hindu Epic Mahabharatham"***where, the five heroes **"*Panja Pandavars*"** father is '***Paandu'.***

It is said that this man, when born was very pale. Like ***Paandu Maharaja*** people who suffer by anaemia are pale in colour. So the disease named as ***Paandu Noi.***

***VERU PEYARKAL* (SYNONYMS):**

Veluppu noi, Venmai noi, Venpaandam.

***IYAL* (DEFINITION):**

தேகத்தின் இரத்தத்தில் உள்ள சிவந்த அணுக்கள் குறைந்து தேகம் வெளுத்துவிடுவதற்கு பாண்டு நோய் என்று பெயர்.

-அகத்தியர் வைத்திய பிள்ளைத்தமிழ்

The great *siddhar Agasthiyar* defined *Paandu Noi* in following verses:

''கழிவாகுந்த தேகமப்பா காணத்தச வத்தாய்
வுற்றிவிடு மன்னவாசல் கேட்கில்
பழிகாரர் முகத்தில் முழியார் போலே பாண்டமெல்லாம்
வெளுக்கடித்து ரத்தம்''

-அகத்தியர் வைத்திய காவியம்

As per the above literature *Paandu Noi i*s a condition characterized by pallor of the conjunctivae, nail buds and body due to reduction of the red blood cell volume.

‘‘தேகத்தில் இரத்தம் வற்றித்
தீங்கான விந்த நோய் காணுமப்பா’’

-அகத்தியர் குணவாகடம்

Page no: 6

Pathartha Chindamani Status That:

‘‘வாமென்ற மேனியெல்லாம் மஞ்சளித்து மகாவெளுப்பு
உண்டாகி மந்தக் கண்ணாய்’’

-பதார்த்த குணசிந்தாமணி

Page no: 272

Noi Varum Vazhi (Etiology):

Aeitiological factors were mentioned by different siddhars. It includes food habits, life styles, morality etc.

According to ***Balavagadam ,***

‘‘பிறந்தநாள் பிள்ளைக்குத் தானே நன்றாய்
பிதாவாலே பிணியுடலின் மேலே தோன்றும்
கனலது மெத்த காணும் கண்ணுது
வெளுக்கு தானே வெளுத்திடு முதடுதானும்’’

-பாலவாகடம்.

*Paandu no*i may be inherited from the parents. It may be due to genetic factors.

According to ***Yugi Vaithiya Chinthamani*** – *800* the causes of *Veluppu* are as follow

‘‘அறிந்துமே உற்பத்தி சொல்லக் கேளாய்
ஆதிசார மலமிளகி யெந்நேரந்தான்
பரிந்துமே புளியுப்பு பெருத்தலாலும்

பெத்தமா மக்கனியி ருந்தாலும்
மிறிந்துமே தாம்பூல மிக அருந்தலாலும்
மீறியே மதுக்களைத் தான் புசித்தலாலும்
பறிந்துமே பகல் நித்திரை செய்தாலும்
பாண்டு வந்து பாரிலுள்ளோர் படும் பாடாமே.''

-யூகி வைத்திய சிந்தாமணி

Frequent attack of diarrhea, excessive intake of salt and sour food, living in hot surroundings, excessive chewing of pan and nuts, excessive sleeping in daytime are some of the behaviours causing *Veluppu Noi.*

According to ***Thanvanthiri Vaithyam,***

''திருந்திடும் பாண்டு ரோகஞ் சேர்ந்திடுங் குணத்தைக் கேளாய்
இருந்திடும் வாத பித்தச் சிலேற்பன மிவைதான் மாறும்
பரிந்துதா னொன்றோடி டொன்று பொருந்துவதாலும் மண்ணேடருந்து
ஆகிய மூலந் தன்னி லனைந்தவுட் டணத்தினாலுந்
தோகையர் மேகத்தாலும் துயர்மிகு சோகத்தாலுந்
தேகபோ யினை யுள்ளோர்க்குந் தரித்திரஞ் சேர்தலாலும்
வேகமாகந் திரிதோஷங்கள் மிஞ்சியே பாண்டுவாமே

-தன்வந்திரி வைத்தியம்

Page no: 340

Imbalance between the vatham pitham and kabam, eating food along with mud, accumulation of excessive heat, excessive sarrow, poverty and psychological factors may cause the disease *Paandu Noi.*

According to ***Thanvanthiri Vaithyam***part II says that:

''ஏய்ந்த வுட்டினக் காலத்தில் எழும்பிடும் பித்தந்தன்னில்
வாய்த்திடும் உப்புப்புளிப்பு மரிசந்தா னெனும் பதார்த்தம்
சேர்ந்துபித் தந்தான் கெட்டு சிலேற்பனம் பொருந்தித் தேக்கிற்
பாய்ந்து வண்ணத்தனை கெடுக்கும் பயித்தியம் பாண்டுவாமே''

Page no: 341

When the pitha increased in hot seasons due to increase intake of salt, sour and pepper, increased *pitha will deranged kabha* and destroys the complexion of skin and results the *Paandu Noi.*

According to ***Agasthiyar Gunavagadam,***

‘‘கொள்ளடா அபக்குவ போசனத்தாலும்
குடி கெடுத்து.....கிராணியாலும்
கள்ளடா கருப்பத்தின் கிரந்தியாலும்
கனமான இரத்தத்தின் போக்கினாலும்
அன்னடா அதியாம கவனத்தாலும்
அளவற்ற விசாரந்தா னடையும் போதும்
தெள்ளவே தேகத்தில் இரத்தம் கெட்டு
தெளிவான பாண்டுதவ முண்டாம் பாரே’’

-அகத்தியர் குணவாகடம்

Page no: 6

Imperfectly cooked food, negligence in the treatment of diarrhea, profuse bleeding, excessive sarrow leads to *Paandu Noi*.

According to ***Guru Naadi***,

‘‘வயரதனிற் பூநாக தன்னை சார்ந்து
வருந்தியது புற்றுபோற்ப் பற்றி காணும்
எழும்பியது கிருமிதா விடைந்து புக்கில்
இயல்பெருகுங் குடல்மடவாய் சொல்லக் கேளு

Page no: 331

Pathological blood loss may occur due to various causes, one among them is worm infection which leads to chronic blood loss from the intestine hence causes Anaemia.

‘‘கிருமியால் வந்ததோடம் பெருகவுண்டு
கேட்கலதின் பிரிவதனை கிரமமாக
பொருமி வரும் வாயுவெல்லங் கிருமியாலே

புழுக்கடி போல் காணுமது கிருமியாலே
செருமிவரும் பவுத்திரங்கள் கிருமியாலே
தேகமதில் சோகை குட்டம் கிருமியாலே

Page no: 333

According to this,' *sobai'* will occur due to worm infestation, which meant *Paandu Noi.*

According to ***Agasthiyar Paripoooranam -400 ,***

''நல்லோர்கள் பெரியோர்கள் நடத்துஞ் செய்கை
நாட்டிலுள்ள துர்குணங்கள் நகைத்தாலே
பொல்லாத விஷநீர் பற்றி வந்து
தேகமெல்லாம் குஷ்டம் போலவே
சொல்லாத கடி விஷங்கள் குன்மம் பாண்டு''

Page no: 78

Here it is explained that paandu and other diseases occur due to the toxic substances produced in the body by their unhealthy lifestyle.

Due to toxic

''பத்தின யிரத தோடம் பாண்டுவாம் மேனி யெல்லாம்''

Due to impure mercury, over dose of phosphorus, lead, copper sulphate and chronic use of white arsenic produce the synptoms of *Paandu*.

***NOI ENN* (CLASSIFICATION):**

According to ***Baalavaagadam*** *Paandu Noi* is classified into 3 types,

Vaatha paandu, Pitha paandu, Kaba paandu.

CLASSIFICATION OF *PAANDU NOI* BASED ON VARIOUS SIDDHA BOOKS:

According to ***Yugimuni*** *Paandu noi* is classified into 5 types

‘‘கூறவே பாண்டுவிடப் பெயரைக் கேளாய்
குறிப்பாக வைந்துவித மாகும் பாரு
வாரவே வாதமாம் பாண்டி னோடு
மார்கமாம் பித்தத்தின் பாண்டு தானும்
தேறவே சிலேட்டுமமாம் பாண்டு தானும்
திரிதோடப் பாண்டோடு விட பாண்டாகும்’’

Page no: 147

- *Vaatha paandu*
- *Pitha paandu*
- *Silethuma paandu*
- *Thiridosa paandu*
- *Visha paandu*

According to **A*gasthiyar’ S*** view,

‘‘பாரடா பாண்டு வகை சொல்லக் கேளாய்
புரிவான பாண்டது தானஞ் சேயாகும்
வாராடா விவாத பித்தம் சீத பாண்டு
வகையான விடபாண்டு மிருத்திகா பாண்’’

அகத்தியர் குணவாகடம்

Page No:6

- *Vatha paandu*
- *Pitha paandu*
- *Seedha paandu*
- *Vida paandu*
- *Miruthiga paandu*

Yugi Chinthamani -800

According to *Yugi chinthamani -800 paandu noi* is classified into **8** types.

Vatha paandu, Pitha paandu, Kaba paandu, Mukkutra paandu, Vida paandu, Mannun paandu, Eri paandu, nanju paandu.

T.V. Sambasivam Pillai:

According to ***T.V.Sambasivam pillai*** *Paandu Noi* is classified into **6** types.

Vatha paandu, Pitha paandu, Kaba paandu, Mukkutra paandu, Oodu paandu, and Neer paandu.

T*hanvanthri Vaithyam:*

According to *'Thanvanthiri vaithyam' Paandu Noi* is classified into **7** types.

Vatha paandu, Pitha paandu, Kaba paandu, Mukkutra paandu, Pitha Vatha paandu, Sannipatha paandu, and Paithiya paandu.

***Pararasa Sekaram*:**

According to *'Pararasa Sekaram' Paandu Noi* is classified into **5** types,

Vatha paandu, Pitha paandu, Kaba paandu, Sanni paandu, Miruthika paandu.

Jeeva Rakhsmirdham:

According to *'Jeeva Rakhsmirdham' Paandu Noi* is classified into **7** types,

Vatha paandu, Pitha paandu, Kaba paandu, Thiridosa paandu, Nanju paandu, Miruthika paandu, Alimuga paandu.

Vaidhiya sara Sangiraham:

According to *'Vaidhiya Sara Sangiraham*' classified into **5 types,**

Vatha paandu, Pitha paandu, Moola paandu, Moola pitha paandu, Visha paandu.

MURKURIKUNANGAL (PREMONITARY SYMPTOMS):

உணவு முதலிய வேறுபாடுகளால் தீக்குற்றம் மிகுந்து குருதியின் நிறத்தையும் எடையையும் கெடுத்து உடற்கு வேண்டிய ஊட்டத்தையும் கொடாமல் உடலை வெளுக்கச் செய்யும். பின்பு சிறிது தொலைவு நடக்கினும் கால் ஓய்ந்து நோதல், பெருமூச்சு வாங்கல், உணவில் விருப்பமின்மை, வாய்குமட்டல், தலைசுற்றல், கண் இருளல், அடிக்கடி மயக்கமாதல், மார்பு துடித்தல், உடல் இளைத்தல் ஆகிய குறிகளையும் காட்டும்.

பொது மருத்துவம்.

POTHU KURIGUNANGAL(GENERAL SIGN AND SYMPTOMS):

‘‘கனலது மெத்தக் காணும்
கண்ணது வெளுக்குந் தானே.
வெளுத்திடு முதடு தானும்
வெடிக்குமே தலைததான் நோகும்
கனைத்திடுஞ் சோப மாகிக்
கைகாலல்க ளசதி காணும்
பழுத்திடும் முகம்வே றாகும்
பாரமாய் பசியெ டாதாம்
பாலவாகடம்

- Pallor present in conjunctivae, tongue, nail buds,
- Headache
- Anorexia
- Fatigue/ weakness
- Loss of appetite

இந்நோயில் உடல் வன்மை நாளுக்கு நாள் குறைந்து நடக்க இயலாமை, தலைநோதல், மார்புதுடித்தல், கண் அடிக்கடி இருளல், தலைசுற்றல், மயக்கமுண்டாதல், மூச்சுத் தடுமாறல், பசித்தீ கெடல், உணவு வேண்டாமை, உண்ட சிறு உணவும்

வாந்தியாதல், ஆகிய குறிகள் தோன்றும் இன்னும் மிகவும் வெளுத்துத் தோல்சுருங்கல், உடல் மெலிந்து பளபளபத்து வெளுப்பதால், நகக்கண்கள் தடித்து வெளுத்தல், நா வெடித்துப் புண்ணாதல், அல்லது நாவின் மேல்தோலை சீவியெடுத்தது போன்று சிவந்து காணுதல் அல்லது நாக்கு பட்டுத்துணிபோல் வழுவழுத்து வெளுத்துக் காணல் தொண்டை கட்டல் என்னும் குறிகளும் காணும்.

- பொது மருத்துவம்

- Loss of weight
- Headache
- Palpitation
- Dimness of vision
- Giddiness
- Fatigue
- Dyspnoea on excertion
- Loss of appetite
- Pallor in conjunctivae, skin, nail buds
- Angular stomatitis

“போமே தான் தீபனங்கள மட்டுப்பட்டு
பொலிவான கண்விழிகள் பெரித்துத் தோன்றும்
ஆமே தான் அசத்தியு மாயாசங் கண்டு
அவர் நடையும் தளர்ந்து பெருமூச்சு கண்டு
மூமேதான் மூர்ச்சை யுடன் மார்துடித்து
முடிவான கணுக்கால் வீக்கமுண்டாய்”

-அகத்தியர் குணவாகடம்

Agasthiyar Gunavagadam states that, dryness of the skin, pallor of the face, eyes, lips, tongue, and nails low volume pulse, anorexia, swelling of the eyelids, tiredness, dyspnoea on excertion, palpitation, oedema of the ankle joint, added heart sounds are mentioned as the signs and symptoms of *Paandu Noi*.

According to ***Agasthiyar Vaidhiya Rathna Churukkam****:*

"உற்றதோர் அன்னபேதம் அரோசக முதர மந்தம்
முற்றிமாப்பு நோய் மூத்திரம் பொன்னின் வன்மை
வெற்றிசேர் புறங்கால்கை கணண் வீங்குடல் வெளுத்தல் வேர்த்தல்
பற்றி தொக்கிற்காய் பயித்திய பாண்டுவாமே"

Page No: 61

- Imperfectly cooking food
- Anorexia
- Dyspnoea – chest pain
- Yellow coloured urine
- Ankle oedema
- Swelling of the eyelids
- Pallor of skin
- Sweating

The above said are the clinical manifestation of the *Paandu Noi* as per the details collected from *Agasthiyar Rathina Churukkam.*

SYMPTOMS OF VARIOUS TYPES OF PAANDU NOI:

Pitha Paandu:

"வாமென்ற மேனியெல்லாமஞ்சளித்து
மகாவெளுப்பு உண்டாகி மந்தக்கண்ணாந்
தாமென்ற தாகமொடு மூர்ச்சை யாகுந்

தனிவாயில் மிளகுபோற் றானு றைக்கும்
நேமென்ற நெஞ்சுமுள் தானு முண்டாய்
நெருக்கியே மூச்சுமுட் டதுவே யாகுங்
கோமென்ற கிறுகிறுத்து வாய்கைப் பாகுங்
கிளர்பித்த பாண்டுவெனக் கூறலாமே''
-யூகிமுனி

Yellowish discolouration of skin, diminished of the skin, thirst, fainting, tastes acrid like pepper, dyspnoea, bitter taste in mouth, are mentioned as the symptoms of *Pitha Paandu* by *Yugi Muni.*

Mannun Paandu:

இ.ந்து சிறு குழந்தைகளும், சிறு வயதினரும், கருவுற்ற பெண்களும், மண், சாம்பல், திருநீறு, கற்பூரம், இவற்றின் மீது தனித்த இச்சைகொண்டு அளவு கடந்து உண்பதால் காணும் நோயாகும். உட்கொண்ட பொருள்களுக்கேற்ப வயிறு ஊதல், செரியாமை, வாந்தி, கழிச்சல், சுரம், வயிற்றுப் புழு முதலிய நோய்கள் கண்டு உடல் மெலிந்து, குருதி வற்றி, வெளுத்து, வீங்கி, மார்பு துடித்தல், முதலிய குறிகுணங்களையும் காட்டும்.

-சித்த மருத்துவம்.

***MUKKUTRA VERUPAADUGAL*(PATHOLOGY):**

'*Udal vanmai'* is affected due to excessive intake of salts and sour foods, which cause indigestion and loss of appetite, due to this '*Rasa', 'Raktha thathus'* are not well nourished. In addition to that *'Ranjaga Pitham'* is also disturbed which is responsible to gives redness to the blood leading to an increase in *pitha kutram*. Following this *'Vaadha kutram'* and *'kabhab kuttram'* too gets altered with the atraction of *'paravugal'.* Futher *'kabam'* increases and producing generalized swelling of the body.

So this condition is due to increase in *'Pitha kutram'* which in due course, was supported by an increase in *'Vaadha kutram' and 'kabha kutram'* with the alteration *of paravugal.*

According to *Agasthiyar gunavagadam* due to nutritional defect ie, Low iron diet leads to derangement in *'Ranjaga pitham'. Ranjaga pitham* which is responsible for the

production of blood and it gives colour to the blood. So increase *pitha* humours leads to *Paandu Noi*.

NAADI NADAI:

Naadi is omni present cosmic vibrant, vital force connecting the macrocosmic with the humanbody is a subtle diagnostic tool handled by the siddhars from the unknown past. These vibrations enter the human body from the universe, keep the life vibrant continuously and aquire the energy required for human metabolism. The examination of Naadi has been recognized as one of the principal means of diagnosis and progonosis of the disease from time immemorial. Any change in their dhoshas is best diagnosed by feeling the naadi, the power of the Naadi manifest in the body as their vital forces namely vadha, pitha and kabha, the three uyir thathukal which regularize and integrate the life activity in each and every living being.

Increase or decrease in mathirai level of *Vaatham, pitham, kabam* are felt using the fingers

- ✓ Index fingers for *vaatham*
- ✓ Middle fingers for *pitham*
- ✓ Ring fingers for *kabam*

Naadi nadai in Paandu noi*:*

Pitha naadi, kabha naadi, vatha kabha naadi, kabha vatha naadi,kabha pitha naadi may present. The quotations from *sadhaka naadi nool* and *valmeegiyar vaithyam* confirm this fact.

“சிறப்பான **பித்ததில் வாத நாடி**
சேரிலூறதாது நட்டமுதர பீடை
ஊறைப்பாகச் செரியாமை குன்மஞ்சூலை
யுற்ற சுரங்கிராணி வயிற்றிரைச்சல் மந்தம்
அறைப்பான ஒங்கார புறநீர்கோவை
ஆயாச மிரக்கமொடு மயக்க மூர்ச்சை
முறைக்காய்வு விஷவீக்கம் மூல வாய்வு
முரடான நோய்பலவு முடுகும் பண்பே” -

Page no: 184

‘‘தானமுள்ள **சேத்துமந்தா** னிளகில் வெப்பு.

சயமீளை இருமல்மந் தார காசம்

ஈனுமுறுஞ் .....

.....

ஏனமுறுங் காமாலை **பாண்டு** சோபை

ஏழுசுரங்கள் பலதுக்கம் விடமுண்டாமே’’

Page No:179

‘‘கண்டாயோ **சிலேற்பனத்தில் வாத நாடி**

கலந்திடு .....

.....

விண்டாலே இளைப்பிருமல் சோபை **பாண்டு**

.....

page no: 184

‘‘இடமான**சேத்துமத்தில் பித்த நாடி**

எழுந்தனுகில் விடமுடனே வீக்கமுண்டாம்

திடமான குளிர்காய்ச்சல் மஞ்சள் நோவுந்

தேகத்திலுளைச்சலிளைப் பிருமல் வாந்தி

விடமான நெஞ்சடைப்பு சுவாசம் விக்கல்

வெகுசுரமும் நாவறட்சி **பாண்டு ரோகம்**

அடமான குவளைரத்த மதிசாரந்தான்

அணுகிவெகு பலநோய்க்கு தடங்கண்டாயோ’’

Page No: 187

Valmigiyar Vaithiyam:

‘‘குதித்திடும் வாதநாடி கூடிடும் பித்தத்தோடே

தத்தியே நடக்குமாகில் சரீரமே மெத்துவத்தி

மெத்தவே வாய்நீருறி மேனியே வெளுத்துக் காணும்

பித்தபாண்டு ரோகமென்று பேசினார் சூதாயத்தானே’’

வால்மீகியர் வைத்தியம்

Page No: 34

Asathiya Kurigunagal:

If diarrhea persists in *"Paandu Noi"* the prognosis is said to be bad as given in *'kannusamiiyam'* and also in *'Sathaga naadi'*

"பாண்டு பிரமேகம் பன்வாத சூளைகுன்மம்
வேண்டா சயஞ்சன்னி வெண்சோபை நீண்ட
அதிநீரே காமாலை யானனபிணி தம்மு
ளதி சாரமா காதறி."

-கண்ணுசாமியம்

"தானான பிரமேகம் வாத சூலை
சார்வான நீரழிவு குன்ம ரோகம்
மானான சயரோகஞ் சன்னி தோடம்
அடுத்தவிடங் காமாலை பாண்டு சோகை
மானேகேள் கபரோக மந்திர வியாதி
மஞ்சள்நோய் குலைநோவு பயித்திய ரோகம்
ஊனாகும் வருமிடத்தில் அதிசா ரங்கள்
உண்டாகில் அசாத்தியமா முறுதி தானே"

-சதக நாடி

வெளுப்பு நோயில் அதிசாரம் வந்தால் இந்நோய் தீராது.

வெளுப்பு நோயில் வாந்தி, கழிச்சல், வீக்கம், நீர்வேட்டை, விக்கல், ஆகிய குறிகுணங்களில் ஒன்று அல்லது பல அந்நோய்களில் துணை நோயாகித் துன்பங்களை அதிகமாக விளைவிக்கின் எளிதில் தீராது.

-சித்த மருத்துவம்.

PINIYARI MURAIMAI (DIAGNOSIS):

Piniyarimuraimai is the method of diagnosing disease affecting the man. It is based upon three main principals. They are

1. **Porial arithal** (Inspection of as the five senses of perception namely Skin, Tongue, Eyes, Nose, and Ear)

2. **Pulanal arithal** (Palpation of five objects of senses, which are tactile sensation, Taste, Sight, Smell, and Sound)

3. **Vinathal (**Interrogation**)**

FINDING WITH RESPECT TO PAANDU NOI:

Pori, Pulanal Arithal:

MEI:

- Pallor of skin
- Mild Yellowish discolouration of skin, the characteristic feature of all pitha disease.
- Koilonychias

VAI:

- Pallor of tongue
- Glossitis
- Angular stomatitis
- Atropy of papillae(Bald tongue)

KAN:

- Pallor of conjunctivae

VINATHAL:

- Anorexia
- Breathlessness / Dyspnoea
- Dimness of vision
- Thirst
- Palpitation
- Faintness

- Giddiness
- Lack of concentration
- Lack of memory

ENVAGAI THERVUGAL:

Envagai Thervukal is a unique method of diagnosing the disease, which was developed by *Siddhars*.

> ‘‘நாடிப் பரிசம் நாநிறம் மொழிவிழி
> மலம் மூத்திரமிவை மருத்துராயுதம்.’’
> ‘‘மெய்க்குறி நிறந்தொளி விழிநா விருமலம் கைக்குறி’’
> -நோய் நாடல் நோய் முதல் நாடல்.

1. *Naa*
2. *Niram*
3. *Mozhi*
4. *Vizhi*
5. *Malam*
6. *Moothiram*
7. *Sparisam*
8. *Naadi*

PAANDU IN RELATION WITH ENVAGAI THERVUGAL:

- ***Naa* (Tongue):** pallor of tongue, loss of taste buds, glossitis, stomatitis, atropy of papillae are seen.
- ***Niram (*colour):** whether the natural colour becomes pale / dimished.
- ***Mozhi* (sound):** This include clarity of speech, any disturbances, high or low pitched voice, slurring and incoherent speech and horseness of voice.
- ***Vizhi* (Eyes):** pallor of conjunctivae, dimness of vision is seen

- ***Sparisam* (palpation):** The warmth, chillness, dryness, roughness of the skin, sweating, tenderness, ulcer, and hepatomegaly may be noted.
- ***Maalam* (Faeces):** Constipation / diarrhea may be noted.
- **Moothiram (Urine):** At times oliguria

***NEER ILLAKKANAM* (Method of collection of urine):**

"அருந்து மாறிரதமும் அவிரோதமுமதாய்
அடகல் அலர்தல் அகாலவூன் தவிர்ந்தழநற்
குற்றளவருந்தி உறங்கி வைகறை
ஆடிக்கலசத் தாவியே காது பெய்
தொருமுகூர்த்தக் கலைக்குட் படுநீரின்
நிறக்குறி நெய்க்குறி நிருபித்தல் கடனே"

-தேரர் நீர்க்குறி நெய்க்குறி நூல்.

Page no: 265

After waking up in the morning, the first voided urine is collected in a wide mouthed glass container and is subjected to the analysis within one and half hours.

NEER KURI:

"வந்த நீர்க்கரியெடை மணம் நுரை எஞ்சலென்"

-சித்தமருத்துவாங்கசுருக்கம்.

Urine has the following characters,

Niram - colour

Edai - weight

Manam – odour

Nurai - froth

Enjal - sediments /quality.

These factors play a major role in diagnosing a disease.

NEIKURI:

‘‘நிறக்குறிக் குரைத்த நிருமான நீரிற்
சிறக்க வெண்ணெய்யேர் சிறுதுளி நடுவித்
தென்னுறத் திறந்தொலி யோகதமைத்ததி
னின்றதிவலை போம் நெறிவிழியறிவும்
சென்றுத புகலுஞ் செய்தியை புணரே’’

-தேரர் நீர்க்குறி நெய்க்குறி நூல்.

Page no: 279.

The specimen collected for neikuri is kept open in a glass dish being exposed well to the sunlight. Add one drop of gingily oil without shaking. It should not be disturbed from its position and spreading of the oil drop should be noted.

‘‘அரவென நீண்டின.்.தே வாதம்’’

‘‘ஆழிபோற் பரவின் அ.்.தே பித்தம்’’

‘‘முத்தொத்து நிற்கின் தொழிவ தென் கபமே’’

- *Vadha neer* - oil drop spread out like a snake.
- *Pitha neer* - oil drop resemble the shape of ring on spreading
- *Kabha neer* - oil remain and floating like a pearl

***NEIKURI IN PAANDU NOI*:**

The sample collected for observing Neikuri from patients with paandu noi, showed a ring shaped structure. Because the prime cause ofbthe disease is the increase in *pitha kutram.*

UYIR THATHUGAL:

Three vital forces are necessary in proper ratio for the normal functioning of the body. They are,

- *Vatham*
- *Pitham*
- *Kabham*

Each one of it has got its own characters and function in the body.

VATHAM:

Ten form of vatham in paandu noi:

1.	***Piranan (Uyirkaal)***	– Affecteddue to breathlessness dyspnoea**.**
2.	***Abhanan (kizhnokkumkaal)***	**–** Affected in case of constipation
3.	***Viyanan (paravukaal)***	– Affected because of pallor of the skin.
4.	***Udhanan(Melnokkukaal)***	– Generally not affected
5.	***Samanan(Nadukkaal)***	**–** Affected because of anorexia
6.	***Naagan***	**–** Generally not affected
7.	***Koorman***	**-** Affected because of dullness of vision**.**
8.	***Kirukaran***	**–**Affected in case of anorexia.
9.	***Devadhathan***	**–** Affected in case of sluggishness and insomnia
10.	***Dhananjeyan***	**–**Not appliable

PITHAM:

Five form of *pitham, in Paandu Noi*

1.	***Anal pitham (paasagam)***	– Affected because of loss of appetite.

2. ***Ranjagam (vannapitham)*** –Affected because of haemoglobin concentration is altered

3. ***Prasagam (Olithee)*** – Affected because of pallor of skin.

4. ***Sathagam (Atralanal*)** – Affected because of inability to do the works properly and sluggishness.

5. ***Aalosagam (Nokkazhal)*** – Affected because of dimness of vision.

KABAM:

Five form of kabam, in paandu noi

1. ***Avalabagam*** **–** Affected because of dyspnoea.

2. ***Kilaethagam*** **–** Affected because of anorexia

3. ***Pothagam*** – Generally not affected

4. ***Tharpagam*** **–** Generally not affected

5. ***Santhigam*** – Generally not affected

UDAL KATTUGAL:

1. *Saaram*
2. *Senneer*
3. *Oon*
4. *Kozhuppu*
5. *Enbu*
6. *Moolai*
7. *Sukkilam / suronitham.*

These are the seven udal kattugal building elements of the human body whose normal function is essential for our well being. Any deviation of this thathus will lead to pathological conditions.

CHARACTERS:

Saaram:

Separated from food. Nourishes the body.

Senneer:

It is responsible for the existence of knowledge, strength, glory and blood components.

Oon:

Moulding the shape of the body and muscles.

Kozhuppu:

Acts as lubrication for the fumctioning of organs and provide a cover for the body.

Enbu:

Structural unit of the body – Responsible for the shape of the body.

Moolai:

It represent the bone marrow and it strengthens the bone.

S*ukkilam/ Suronitham:*

Responsible for the propagation of species.

Affected Thathus In Paandu Noi:

Saaram:

Affected because of anorexia and indigestion

Senneer

Affected because of pallor of skin and conjunctiva

PARAVUKAALAM* (SEASON)*:

The whole year is constituted by six seasons, which will modify the physiology and make them susceptible to certain specific diseases which are common in that season.

Physiologically the types of alteration of *mukkutram* are,

Paruvakaalam	***Thannilai Valarchi***	***Vetrunilai Valarchi***	***Thannilai Adaithal***
Kaar kalam (Aavani & purataasi)	*Pitham*	*Vaatham*	-
Koothir kaalam (Aippasi & kaarthigai)	-	*Pitham*	*Vaatham*
Munpani kaalam (Maargazhi & Thai)	-	-	*Pitham*
Pinpani kaalam (Masi & panguni)	*Kabam*		
Illavenil kaalam (Chithirai & Vaigasi)		*Kabam*	
Mudhuvenil kaalam (Aani & Aadi)	*Vatham*		*Kabam*

THINAI (LAND):

Siddhars classified the lands into five types. They are

1. *Kurinji* - Mountain range
2. *Mullai* - Pastoral area of the forest
3. *Marutham* – The fertile river bed
4. *Neithal* – The coastal region
5. *Paalai* - Arid desert.

- The winter season gives good health to the man, early summer and latter rainy gives moderate health. Whereas early rainy and latter summer are more prone to diseases, that's why Siddhars called it as *Aanaga kaalam.*

- *Marutham nilam* is the fertile area where no disease occur.

People living in *Kurinji, Mullai, Neithal* and *Paalai* may have increased chance to acquire *paandu noi*.

THODAR NOI OF PAANDU NOI(COMPLICATION):

According to *Agasthiyar Vatha Naadi,*

விளம்பவே பாண்டு முற்றிருக்கும் போது
மீறியே பித்தவஸ்துதனைப்.....
பூண்டிடுமே காமாலை யெனும் ரோகம்''

Page no: 269

When the disease progresses *kabam* increases resulting in *sobai* (oedema), and when *Paandu Noi* is severe excessive intake of pitha diets leads to *kaamaalai* (jaundice).

In Sarabendra Vaidhi Muraigal:

According to siddha system of medicine as per *Yoogimuni* chronic Anaemia associated with following disease like

LINE OF TREATMENT FOR PAANDU NOI:

The speciality of siddha treatment emphasise not only for complete healings but also for the prevention and rejuvenation. This is said as follows,

- ✓ Kaappu(Prevention)
- ✓ Neekkam(Treatment)
- ✓ Niraivu(Restoration)

When treating for cure of the disease the following principle s must be noted.

''நோய்நாடி நோய்முதல் நாடியது அதுதணிக்கும்
வாய்நாடி வாய்ப்ச் செயல்'' -திருக்குறள்

To diagnose the disease and to find out the root cause of the disease and then to make the plan about curing the disease will provide good treatment.

Our *siddha system* of medicine is focused more on food habits and lifestyles on treatment. The change in food habits paves way for the derangement of 'Thirithodam', which is the root cause for several aliments.

The normal mathirai level of *vaadha, pitha, kabha kutram* are 1:1/2:1/4. The principle reason for variation in this level is food changes.

The aim of the treatment of treatment in *Paandu Noi* (Iron Deficiency Anaemia) most of the children are affected by worms (any ova) infestation so antihelminthic drug are used first.

All the cases are affected by loss of appetite. So best appetizers are used to give.

Treatment is given not only to cure the disease but for its prevention and rejuvenation. Especially in Paandu Noi, *Rasam, Ratha thathus* are mostly affected. So Iron components are used in the trial drug. Also food rich in iron is recommended.

TRIAL DRUG:

The author took ***Chitramutti Nei*** as a trial drug for *Paandu Noi*

Dose: 4 – 5 ml, twice a day, after food

DIET:

"மருந்தே உணவு உணவே மருந்து

மாறுபாடில்லாத வுண்டி மறுந் துண்ணின்

ஊறுபா டில்லை யுயிர்க்கு."

Dietetics is of great importance in Siddha system especially in *Paandu Noi* diet is main factor for good prognosis. As over in take of consuming unbalanced and incomparable diet is considered to be the prime causative for upsetting the three dosha balance leading to manifestation of various aliments.

- Easily digestable food with iron content is preferred.

    a. Karisalai, Ponnanganni, Sirukeerai, Arukeerai, Manathakkali, Murungai keerai.

    b. Katharipiinju, Avarai pinju, Murungai pinju, Vazhaikattchal.

- In the earlier stage of the disease food substances that are capable of stimulating the appetite and improving haemoglobin content of blood are given.

- In severe case with anorexia and indigestion only kanji and soups are advised.

- To improve general health Kaadai, Gowthari, Udambu, Vellattukari, are included in the diet

- Regular consumption of dates are encouraged

- Wheat, Green leafy vegetables, and oats are rich in iron.

- Fruits, which are rich in iron like Orange, Apple, Grapes, Pomegranate, Fig, Goosebery, Banana were encouraged.

- Ragi, Panai Vellam, Kadalai, Ellu can be given.

MODERN ASPECT

The commonest nutritional deficiency disorder present throughout the world is iron deficiency anaemia.

Blood is a connective tissue in fluid form. It is considered as **the fluid of life**, because it carries oxygen from lungs to all parts of the body and carbon dioxide from all parts of body to the lungs.It is known as **the fluid of growth** because it carries nutritive substances from the digestive system and hormones from endocrine gland to all the tissues.The blood is also called **the fluid of health** because it protects the body against the diseases.

Blood contains iron in the form of haemoglobin and as cytochromes etc. Any form of iron deficiency cause anaemia.

PROPERTIES OF BLOOD:

Color : Blood is red in color.

Arterial blood is scarlet red

venous blood is purple red.

Volume : Average volume of blood

- 5litre [in **normal adults]**.

-450ml [in **new born baby].**

-4.5ml [in **female]**.

pH: 7.4

Specific gravity:

Total blood -1.052 – 1.061

Blood cells -1.092 – 1.101

Plasma -1.022 – 1.026

Viscosity:

Five times more viscous than water due to red blood cell and plasma proteins.

COMPOSITION OF BLOOD:

Blood consists of a solid protein 45% and a fluid protein 55%

- Solid protein constitutes RBC,WBC and platelets
- Fluid portion is plasma

BLOOD CELLS:

Blood cells are of three types

1. Red blood cells or erythrocytes
2. White blood cells or leucocytes
3. Platelets or thrombocytes

Red blood cells or Erythrocytes:

The major function of red blood cells, also known as erythrocytes. The red color of the red blood cells is due to presence of the coloring pigment called haemoglobin. RBC plays a vital role in transport of respiratory gases.

The RBC count - 4 to 5.5 million per cubic mm of blood.

- **In adult males** - 5million /cu.mm
- **In adult females** - 4.5 million /cu.mm

MORPHOLOGY OF RED BLOOD CELLS:

Normal Shape **:** Disc Shaped And Biconcave (Dumb-Bell Shaped).

Normal Size **:** 7.2µ (6.9 – 7.4µ) In Diameter.

Thickness **:** Periphery-2.2µ (Thicker)

Centrally-1 µ (Thinner)

Surface Area **:** 120sq.µ

Volume **:** 90 -95cu. µ

ERYTHROPOIESIS:-

Erythropoiesis is the process which involve the origin, development and maturation of erythrocytes.

Sites of Erythropoiesis:-

- First two months of intrauterine life - mesenchyme of yolk sack.
- From three months of intrauterine life- Liver, Spleen, Lymphoid organ.
- Last three months of intrauterine life- Red bone marrow and Liver.
- In new born babies, growing children, and adults RBCs are produced only in red bone marrow.
- Upto the age of 5to 6 years - Red bone marrow of all the bones.
- From the age of 6 to 20years- Red bone marrow of all the long bones and flat bones.

Process of erythropoiesis:-

Stem cells:

The stem cells are the primitive cells in the bone marrow, which give rise to all the blood cells. Stem cells are defined as a cell which is capable of both self-renewal and differentiation.

Pluripotent haemopoietic stem cells (PHSC) are derived from stem cells. PHSC are defined cells that can give rise to cells of all groups of haemopoietic cells like myeloid cells and lymphoid cells.

In the early stages, the PHSC are not designates to form a particular type of blood cell, and it is also not possible to determine the blood cell to be developed from these cells , hence the name uncommitted PHSC.

In adults only a few number of these cells are present. Best source of the cells is the umbilical cord blood.

When the cells are designated to form a particular type of blood cells the uncommitted PHSCs are called committed PHSCs.

Committed PHSCs are of two types.

1. **Lymphoid stem cells (LSC**)- which gives rise to Lymphocytes and natural killer (NK cells)

2. **Colony forming blastocytes**- Which gives rise to myeloid cells.

Myeloid cells are the blood cells other than lymphocytes.

When grown in cultures these cells form colonies hence the name colony forming blastocytes.

The different units of colony forming cells are:

- **Colony forming unit – Erythrocytes(CFE-E)**

  Cells of this unit develop into erythrocytes.

- **Colony forming unit granulocytes –Monocytes (FU-GM)**

These cells give rise to granulocytes (Neutrophils, Basophils and Eosinophils and Monocytes)

- **Colony forming unit- Megakaryocytes(CFU-M),**

  Platelets are formed from these cells

Changes during Erythropoiesis:

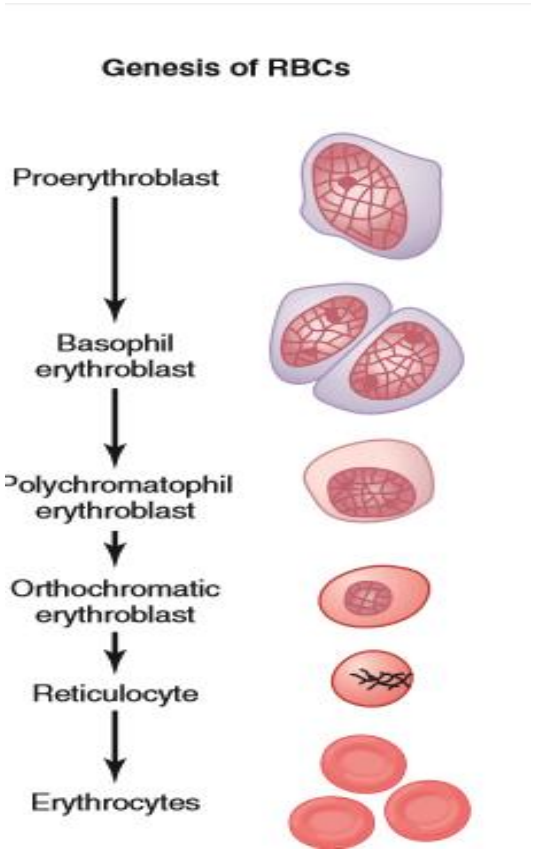
Cells of CFU-E pass through different stages finally become **matured RBCs.** During these changes **four** important changes are noticed

- ✓ Reduction in size of the cells
- ✓ Disappearance of nucleoli and nucleus
- ✓ Appearance of haemoglobin
- ✓ Changes in the staining properties of the protoplasm.

STAGES OF ERYTHROPOIESIS:

Various stages between CFU-E cells and matured RBCs are

1. **Proerythrolast**
2. **EarlyErythroblast**
3. **Intermediate Erythroblast**
4. **Late Normoblast**
5. **Reticulocyte**
6. **Mature Erythrocyte**



FACTORS NECESSARY FOR ERYTHROPOIESIS:-

- General factors
- Maturation factors
- Factors necessary for haemoglobin formation

General factors

General factors necessary for erythropoiesis are

1. Erythropoietin
2. Thyroxine
3. Hemopoietic growth factor
4. Vitamins-B, C, D and E

Maturation factors

1. Vitamin B_{12}(Cyanocobalamin)
2. Intrinsic factor of castle
3. Folic acid

Vitamin B_{12} (Cyanocobalamin)

Vitamin B_{12} is called extrinsic factor because it is obtained mostly from diet. Vitamin $B_{12}$is stored mostly in the liver and in small quantity in muscle.When necessary, it is transported to the bone marrow to promote maturation of RBCs.

Intrinsic factor of castle

The extrinsic and intrinsic factors are together called haematinic principle.

Folic acid

It is also essential for maturation. It is required for the synthesis of DNA. In the absence of folic acid the synthesis of DNA decreases causing failure of maturation.This leads to anaemia

Factors necessary for Haemoglobin formation:

Various materials are essential for the formation of haemoglobin in the RBCs.

Such factors are,

1. **First class protein and aminoacids**
2. **Iron:**

-It is necessary for the formation of heme part of the haemoglobin

3. **Copper:**

-It is necessary for the absorption of iron from the gastrointestinal tract.

4. **Cobalt and nickel:**

-It is essential for the utilization of iron during haemoglobin formation.

5. **Vitamins:**

-Vitamin C, Riboflavin, nicotinic acid and pyridoxine is also essential for the formation of haemoglobin.

LIFE SPAN AND RATE OF RBC:-

Average life span of red blood cells is about 120 days.The senile red blood cells are destroyed in reticulo-endothelial system.

When the cells become older the cell membrane becomes more and more fragile. So these cells are destroyed while trying to squeeze through the capillaries. The destruction occurs mostly in the capillaries of the spleen because the splenic capillaries have a thin lumen. So the spleen is usually called **'Grave yard'** of red blood cells.

Daily 10 % of RBCs, which are senile, are destroyed in normal young healthy adults. It causes release of about 0.6g% of haemoglobin into plasma.

HAEMOGLOBIN

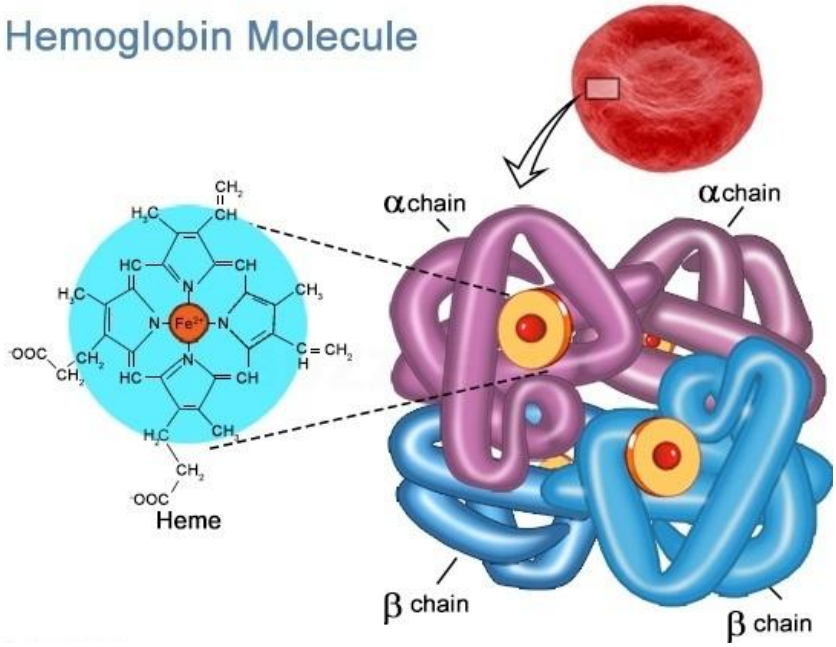
Haemoglobin is the coloring matter of RBC. The molecular weight of haemoglobin is 68,000.

STRUCTURE OF HAEMOGLOBIN

Haemoglobin is a conjugated protein. It consists of a protein combined with an iron containing pigment in **heme**.

- ✓ Heme also forms a part of structure of **myoglobin** (oxygen binding pigment in muscles)
- ✓ **Neuroglobin**(Oxygen binding pigment in brain)

STRUCTURE OF HAEMOGLOBIN



Iron :

Normally it is present in ferrous form Fe^{++}. It is in unstable or loose form.

Porphyrin :-

The pigment part is called porphyrin. It is formed by four **pyrole ring** called **I, II, III, IV**. The Pyrole rings are attached to one another by **methane (CH_4) bridge**

The iron is attached to

-N of the each pyrole ring and

-N of the globin molecule

Globin

This contains four polypeptide chains

α chains-2

β chains -2

Types of haemoglobin

Haemoglobin is of two types

1. Adult haemoglobin- HbA
2. Fetal haemoglobin- HbF

There are structural differences between the two types of haemoglobin. In adult haemoglobin, the globin contains two α chains and two β chains. In fetal haemoglobin, there are two α chains and two γ chains instead of β chains.

METABOLISM OF HAEMOGLOBIN:

Synthesis of haemoglobin:

Synthesis of haemoglobin actually starts in proerythroblastic stage. The production of the haemoglobin is continued unit/stage of reticulocyte. The heme portion of haemoglobin is synthesized in mitochondria from acetic acid and glycine.

2 succinyl CoA + 2glycine → 4 pyrrole

4 Pyrrole → Protoporphyrin IX

Protoporphyrin + Fe^{++} → Haeme

Haeme + Polypeptide → Haemoglobin chain(α or β)
2α –chains + 2β chains→Haemoglobin A

The protein part of globin is synthesized in ribosomes.

Destruction of Haemoglobin:-

- After the life span of 120 days, the RBS is destroyed in the reticuloendothelial system particularly in spleen and the haemoglobin is released into plasma. Soon the haemoglobin is degraded in the reticuloendothelial cells and split into globin, iron and porphyrin.

- Globin is utilized for the resynthesis of haemoglobin. Iron is stored in the body as ferritin and haemosiridin which are reutilized for the synthesis of new haemoglobin.

- Porphyrin is converted into a green pigment called biliverdin. In human being most of the biliverin is converted into a yellow pigment called bilirubin.

NORMAL VALUES OF HAEMOGLOBIN OF DIFFERENT AGE GROUP

Age group	Mean(G/dl)	Range (G/dl)
Cord blood	17.1	13.7 – 20.5
7 days	18.8	14.6-23.0
20 days	15.9	11.3- 20.5
45 days	12.7	9.5- 15.9
75 days	11.4	9.6-13.2
120 days	11.9	9.9-13.9
1 year	12.2	10-13.0
5 year	12.5	12-13
10 year	13.5	13-14
Older	15	14-15

PACKED CELL VOLUME AND BLOOD INDICES.

Packed cell volume (PCV) is the haematocrit value expressed as the percentage of cellular elements with that of whole blood.

BLOOD INDICES:

Blood indices are specifically meant for erythrocytes. Blood indices have got diagnostic value in determining the type of anaemia.

DIFFERENT BLOOD INDICES:

Following are the different blood indices

1. Mean Corpuscular Volume (MCV)

Mean Corpuscular Volume is the average volume of single red blood cells and it is expressed in cubic microns(cu.μ)

$$\mathbf{MCV}=\frac{\boldsymbol{PCV\,in\ 1000ml\,or\ 100ml}\times\mathbf{10}}{\boldsymbol{RBC\,count\,in\,millions\,per\,cu.mm}}$$

2. Mean Corpuscular Haemoglobin (MCH)

Mean Corpuscular Haemoglobin is the quantity or amount of haemoglobin present in one red blood cell. It is expressed in micrograms or pictograms(pg)

$$\mathbf{MCH}=\frac{\boldsymbol{Haemoglobin\,in\,grams\,per\ 1000ml\,of\,blood}\times\mathbf{100}\times\mathbf{10}}{\boldsymbol{RBC\,count\,in\,millions\,per\,cu.mm}}$$

3. Mean Corpuscular Haemoglobin Concentration (MCHC)

It is the amount of haemoglobin expressed in relation to volume of one blood cell. So the unit of expression is percentage.

$$\mathbf{MCHC}=\frac{\boldsymbol{Haemoglobin\,in\,grams\,per\ 100ml\,of\,blood}\times\mathbf{10}}{\boldsymbol{PCV\,in\ 100ml\,of\,blood}}$$

4. Colour Index:

This is the ratio between the percentage of the haemoglobin and the percentage of red blood cells in the blood.

$$\mathbf{CI} = \frac{\boldsymbol{Haemoglobin}\%}{\boldsymbol{RBC}\%}$$

All the above mentioned blood indices are reduced in iron deficiency anaemia.

NORMAL VALUES:

Packed Cell Volume (PCV):

3 month – 10 years – 36.0±5.0%

11 – 15 years – 39.0 ± 5.0%

Mean Corpuscular Volume (MCV)

3 months -10 years -80 cu.µ

11-15 years – 82 cu.µ

Mean Corpuscular Haemoglobin (MCH)

3months – 10years -27 picograms

11- 15 years – 28 picograms

Mean Corpuscular Haemoglobin Concentration (MCHC)

3months to 10 years - 34g/dl

11- 15 years - 34g/dl

Reticulocytes:

6 months – 6 years -1.0%

7- 12 years -1.0%

IRON :

Iron is one of the most essential trace elements in the body. Heme is the most predominant iron containing substance. Iron is important for the formation of haemoglobin, myoglobin, cytochromes and other components of respiratory enzymes like cytochrome oxides, catalase and peroxidase.

NORMAL VALUE AND DISTRIBUTION OF IRON IN THE BODY:

The **total quantity of iron in the body is about 4 grams**. The approximate distribution of iron in the body is as follows:

In the haemoglobin – 65 - 68%

In the muscle as myoglobin –4%

As intracellular oxidative heme compound – 1%

In the plasma as transferrin – 1%

Stored in the reticuloendothelial system – 25 – 30%

BIOCHEMICAL FUNCTION:

1. Haemoglobin and myoglobin are required for the transport of $O_2$and CO_2.
2. Cytochromes and certain non heme proteins are necessary for electron transport chain and oxidative phosphorylation.
3. Peroxidase, the lysosomal enzyme, is required for phagocytosis and killing of bacteria by neutrophils.
4. Iron is associated with effective immunocompetence of the body.

Daily iron requirement in different age group.

Males 11 years to 17 years **- 12mg/day.**

Upto 10 years male and female **- 10mg/day**.

DIETARY IRON:

The dietary iron comes from two sourses, heme and non heme, the latter being the major source of iron in diet and is found in varying degrees in all foods of plant origin.

Heme iron is present in meet fish and poultry, but the intake of these product is generally low. Heme iron is better absorbed than non heme iron and is not influenced by dietary factors.

Breast milk even in spite of low levels of iron (0.5mg/lit) has a better absorption and bioavailability as compared to cow's milk. Good source of iron in diet include pulses, dhals, green leafy vegetables, dates, nuts, jaggery, meat and fish. Poor sources of iron in the diet include milk, wheat, polished rice. Administration of 50mg of vitamin C increases iron absorption by two folds.

FACTORS AFFECTING IRON ABSORPTION:

1. Acidity, ascorbic acid and cysteine promote iron absorption.
2. In iron deficiency anaemia, iron absorption is increased to 2- 10 times that of normal.
3. Small peptides and amino acids favour iron uptake
4. Phytates found in cereals and oxalates found in leafy vegetables interfere with iron absorption.
5. A diet with high phosphate content decreases iron absorption while too low phosphate promotes.
6. Impaired absorption of iron is absorbed in malabsorption syndrome such as steatorrhoea.
7. In patients with partial or total surgical removal of stomatch and or intestine, iron absorption is severely impaired.

IRON METABOLISM:

Absorption :

Iron is mainly absorbed in the stomach and duodenum. Iron is mostly found in foods in ferric form. Fe^{3+} bound to proteins or organic acids. In the acid medium provided by gastric hydrochloric acid the $Fe^{3+}$is released from foods. Reducing substances such as ascorbic acid (vitamin c) and cysteine convert ferric iron (Fe^{3+}) to ferrous form Fe^{2+}.Iron in ferrous form is soluble and readily absorbed.

Iron in the mucosal cells:

The iron Fe^{2+}entering the mucosal cells by absorption is oxidized to ferric (Fe^{3+}) form by the enzyme ferroxidase.

Fe^{3+} then combine with apoferritin to form ferritin which is the temporary storage form of iron and is present in gastrointestinal mucosa, bone marrow, liver and spleen. From the mucosal cells, iron may enter the blood stream.

TRANSPORT OF IRON IN THE PLASMA:

The iron liberated from the ferritin of mucosal cells enters the plasma in ferrous state, it is plasma in ferrous state, it is plasma in ferrous state, it is oxidized to ferric form by a copper containing protein, ceruloplasmin. Another cuproprotein ferroxidase II also help for the conversion of $Fe^{2+}$to Fe^{3+}.

Ferric iron that binds with a specific iron binding proteins namely transferrin or siderophilin.

Each transferrin molecule can bind with two atoms of ferric ion Fe^{3+}. The plasma transferrin can bind with 400mg of iron /dl plasma. This plasma is known as total iron binding capacity(TIBC) of plasma.

Hemosiderin is another iron storage protein, accumlate in the spleen and liver when the supply of iron is in excess of body demands.

IRON IS A ONE WAY SUBSTANCE

Iron is very efficiently utilized and reutilized by the body. Further, iron losses from the body are minimal which may occur through bile, sweat, hair loss etc. Iron is not excreted in urine.

ANAEMIA

DEFINITIONS:

Anaemia is present when the haemoglobin level in the blood is two standard deviations below the mean for the particular age and sex.

Physiological definition of anaemia is a condition in which tissue hypoxia occurs due to inadequate oxygen carrying capacity of blood.

WHO criteria for diagnosis of anaemia.

Children of 6 months- 6years <11

Children of 6 years -14 years <12

Grading of Anaemia :

WHO grades anaemia according to haemoglobin level as follows.

- ✓ Hb between 10gram and cut off point for age -Mild
- ✓ Hb between 7-10gram –Moderate
- ✓ Hb under 7gram –severe

CLASSIFICATION:

A. **Based on the Morphology**

Based on the red cell size haemoglobin content and red cell indices anaemia are classified as follows.

1. Microccytic hypochromic anaemia
2. Normocytic normochromic anaemia
3. Macrocytic normocytic anaemia
4. Macrocytic hypochromic anaemia

B .Based on Etiopathogenesis

1. Nutritional anaemia
2. Haemolytic anaemia
3. Haemorrage
4. Bone marrow suppression
5. Infections
6. Miscellaneous

I. Disorders of impared RBC production

a. Deficiency anemia

I. Iron deficiency anaemia

II. Nutritional megaloblastic anaemia (Vit B12 and folate deficiency)

III. Mixed deficiency states (Dimorphic anaemia)

b. Bone marrow failure

1. Aplastic anaemia

- Congenital and acquired
- Acquired

2. Selective red cell aplasia:

- Congenital
- Diamond blacfan anaemia
- Acquired

Eg. Transient erythroblastopenia of childhood.

3. Marrow replacement

- Myelofibrosis
- Osteopetrosis
- Maligancies

c. Impaired erythropoiesis production

- Chronic renal failure
- Hypothyroidism and hypopituitarism
- Chronic malnutrition

d. Miscellanaeous:

1. Congenital dyserythropoietc anaemia's
2. Erythropoietic porphyria

I. Disorders of increased RBC production:

a. RBC membrane defects

Eg. .Hereditary spherocytosis

b. Defects of Haemoglobin synthesis

i. Quantitative(Thalaseemia)

- Alpha
- Beta
- Delta

ii. Qualitative (Haemoglobinopathesis)

Eg. Sickle cell disease HbE disease

iii. Combined –Quantitative and Qualitativedefects

Hbs beta thalassemia

c. Defects of RBC enzymes

- G-6-PD deficiency
- Pyruate kinase deficiency

d. Acquired defects:

I. Immune haemolysis

- Warm and cold antibody type
- ABO and Rh incompactibility

II. Infections

- Malaria
- Kala azar
- Acute bacterial infections

PATHOLOGICAL RED BLOOD CELLS IN ANAEMIA:

In anaemia, many kinds of abnormal red cells including nucleated forms are seen in the circulation. These abnormal cells are,

I. Anisocytosis(Variation in the size of RBC)

Macrocytosis, Microcytosis, Normocytosis

II. Poikilocytosis (Variation in shape of RBC)

Ovalocytosis, Spherocytosis, sickle cells

III. Polychromatophilia (Irregularity in stainig)

This indicates an increase in immature red cells in circirculation and occurs in the following forms

Normoblasts, patchy staining of the cells, Punctate Basophilia (Basophilic stippling) and reticulocytes

IRON DEFICIENCY ANAEMIA

Iron Deficiency Anaemia is the most common and wide spread nutritional disorder present throughout the world, but its prevalence is higher in developing countries.

WHO estimates the number of anemic people worldwide to be a staggering two billion people and that approximately 50% of all anaemia can be attributed to iron deficiency.

Malaria, HIV/AIDS, hookworm infestations, schistomiasis and other infections such as tuberculosis are particularly important factors contributing to the **high prevalence of anaemia** in some areas.

40-50% of children and adult women were anaemic and that accounted for about 50% of anaemia in school children and women 80% in preschool children (2-5 years old)

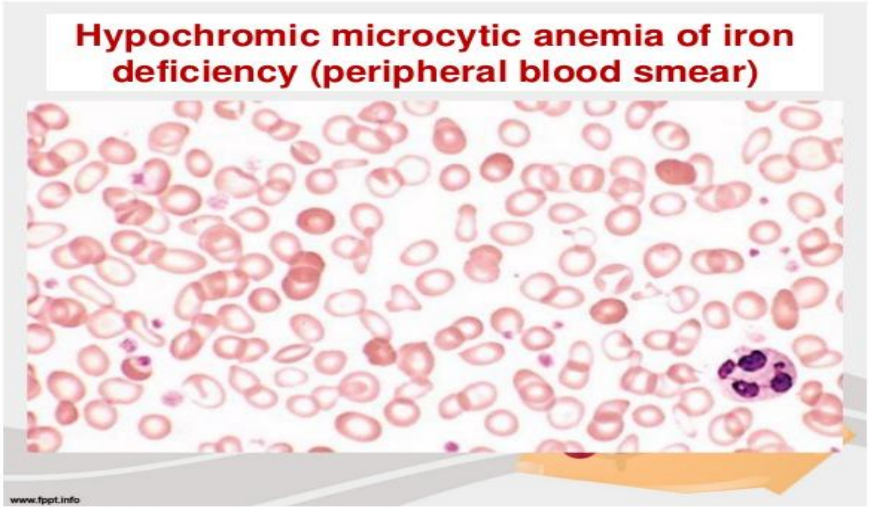
According to third national family health survey (NFHS3)

1. 79% of Indian children have anaemia including
2. 7% of urban children and 84% of these in rural areas

STRUCTURE OF THE RED CORPUSCLES IN IRON DEFICIENCY ANAEMIA:

In iron deficiency anaemia the red blood corpuscles are decreased or normal in number and haemoglobin content of the red blood corpuscles is reduced. In blood smear, the red cells appear pale with a large central pale area and many of the red blood cells appear to be smaller than the normal.

This type of anaemia is called **Hypochromic and microcytic anaemia.**



ETIOLOGY:-

The Etiology varies with the age, sex and country of residence of the patients.

ETIOLOGICAL FACTORS IN IRON DEFICIENCY ANAEMIA:-

Increased physiological requirements:

Rapid growth during infancy and pre adolescence.

Decreased iron stores:

Premature babies and twins

Increased demand during:

Low birth weight, prematurity, adolescence, recovery from PEM.

Poor intake of dietary iron:

Exclusive milk diet, restriction of calories.

Poor absorption:

Celiac disease, giardiasis, drug intake

Excess loss of iron :

Blood loss during childbirth, gastrointestinal haemorrhage, faecal blood loss due to hookworm infestation, genitourinary bleed.

Iron malabsorption:

- Starch and clay eating produce malabsorption of iron and iron deficiency anaemia.
- PICA increases the risk of helminths
- Delayed weaning, infection and lead poisioning
- Sprue, non-tropical sprue, chronic diarrhea, mille induced enteropathy. .
- Rarely errors in metabolism as
  - Sideroblastic anaemia
  - Idiopathic pulmonary hemosiderosis
  - Congenital transferrin deficiency where iron gets stored in the body rather than being utilized for erythropoiesis

Diminish absorption of iron:

Phytates, oxalates, phosphates, carbonates and tannates

Growth

Iron deficiency anaemia is more in children between the ages of 6 months to 2 years and from 11 to 16 years due to spurts of growth during these periods.

Pathophysiology

Diminished dietary absorption in proximal small intestine or excessive loss of body iron can result in iron deficiency

Iron deficiency anaemia develops when the supply of iron to the bone marrow is insufficient for the requirement of haemoglobin synthesis.

Iron is required for multiple metabolic process including

- Oxygen transport
- DNA synthesis
- Electron transport
- In severe iron deficiency, the iron containing enzymes are low and this can affect immune and tissue function.
- Iron deficiency anaemia can result in diminished growth /and learning and have serious consequences in children.
- Healthy new born infants have a total body iron of 250mg (Approximately 80 parts permillion ppm) this decreases to approximately 60 ppm in the first 6 months of the life.
- Body iron is regulated carefully by absorptive cells in the proximal small intestine, which alter iron absorption to match body losses of iron.
- Breast milk iron content is more bioavailable than cow's milk.
- Beside this fact, infants who consume cow's milk have more iron deficiency because bovine milk has a higher concentration of calcium which which competes with iron for absorption and they may have gastrointestinal blood loss due to cow's milk allergy.

STAGES OF IRON DEFICIENCY ANAEMIA

On the basis of biochemical and haematological changes iron deficiency is graded into three stages

Stage I – Depletion of iron store

Ferritin is decreased, transferrin saturation, serum iron and haemoglobin are normal

Stage II- Depletion of transport iron transferrin saturation and serum iron also reduced. Haemoglobin is normal.

Stage – III – State of IDA

Frank features of IDA

The flow of iron to erythroid marrow is impared to cause reduction in haemoglobin concentration with a progressive microcytic hypochromic anaemia associated with the reduced serum iron transferrin saturation and serum ferritin level.

CLINICAL FEATURES:-

Symptoms:

- ✓ Irritability
- ✓ Anorexia
- ✓ Easy fatigability
- ✓ Tiredness/ weakness
- ✓ Diarrhoea is often present
- ✓ Leg cramps
- ✓ Palpitations
- ✓ Inability to concentrate, somnolence, giddiness.
- ✓ Features of causative condition for example epigastric pain (Peptic ulcer)
- ✓ Constipation
- ✓ History of PICA

- ✓ Lack of memory

Signs:

- ✓ Eyes- Pallor in conjuntiva
- ✓ Nails- Pallor, Koilonychias (spoon shaped nails) and platynychia (flat nails)
- ✓ Hair- Dry, lusterless, excess loss of scalp hair
- ✓ Mouth- Bald, atrophy of tongue papillae glossitis, angular stomatitis
- ✓ Abdomen – Mild hepatomegaly is common in children.

ROLE OF IRON DEFICIENCY ANAEMIA IN VARIOUS SYSTEMS

Cardiovascular system:-

Dyspnoea and pslpitstionsre common symptoms but in very severe anaemia the patient may get congestive cardiac failure. Haemic murmurs are commonly heared in anaemic patients.

Respiratory system:-

Dyspnoea and respiratory infections

Central nervous system:-

Symptoms include faintness, giddiness, headache, lack of concentration and drowsiness with severe anaemia, clouding of consciousness, numbness and sometimes tingling of hands and feet.

Renal system:-

Slight protenuria may be present with severe anaemia

Gastrointestinal system:-

Anorexia is the commonest system nausea, flatulence and constipation may also occur slight to moderate smooth hepatomegaly is common in severe anaemia. Liner may become tender. In certain cases of iron deficiency anaemia, spleen may be enlarged.

DIFFERENTIAL DIAGNOSIS OF MICROCYTIC HYPOCHROMIC ANAEMIA

- Thalassaemia
- Pyridoxine deficiency
- Lead poisioning
- Chronic infection
- Sideroblastic anaemia
- Congenital atransferrinemia
- Copper deficiency
- G6PD deficiency

COMPLICATIONS:

- **Infections** are more common in iron deficiency anaemia, especially those of respiratory, gastrointestinal and urinary tracts.
- Chronic iron deficiency anaemia **reduces the efficiency in work and study**
- **CCF**

INVESTIGATIONS:

- **Complete blood count with blood indexes**
  - RBC count decreased, WBC count normal

- Low –mean corpuscular volume (MCV), mean corpuscular haemoglobin(MCH) and mean corpuscular haemoglobin concentration (MCHC)

❁ **Peripheral blood smear** –RBCs are microcytic hypochromic and show anisocytic, poikilocytosis

❁ Normal reticulocyte count

❁ **Serum iron level** - Less than 60μg/dl

❁ **Total iron binding capacity(TIBC)** - >350μg/dl

❁ **Transferrin saturation** - <16% (Normal range-25% -50%)

❁ **Serum ferritin** - Low

❁ **Free erythrocyte protoporphyrins(FEP)**- increased

- Normal 30 – 40% μg/dl
- >70μg/dl indicate IDA

❁ Stainable iron in marrow- low

❁ FEP/Haemoglobin ratio increases. Normal ratio 60 : 1

❁ Iron containing enzymes such as monoamine oxidase, catalase, cytochrome peroxidase s will be – low

❁ **Investigation to determine the cause of anaemia,**

- Stool examination – stools for occult blood, ova, cyst (hookworms).
- Gastrointestinal studies for bleeding, polyp, etc.-

Barium meal examination, upper/ lower GI endoscopy, etc.

DIAGNOSIS:

Following criteria are essential to diagnose iron deficiency anaemia

- History of inadequate intake of dietary iron and blood loss if any.
- Hypochromic and microcytic structure of red blood cells.
- Low serum iron, increased total iron binding capacity.
- Platelet count is either normal or raised.
- Haemoglobin estimation variably reduced
- Reduced mean cell volume
- Erythrocyte count may be normal or reduced less than haemoglobin level would suggest.
- Serum ferritin level is reduced
- Clinical features of anaemia.

MANAGEMENT:

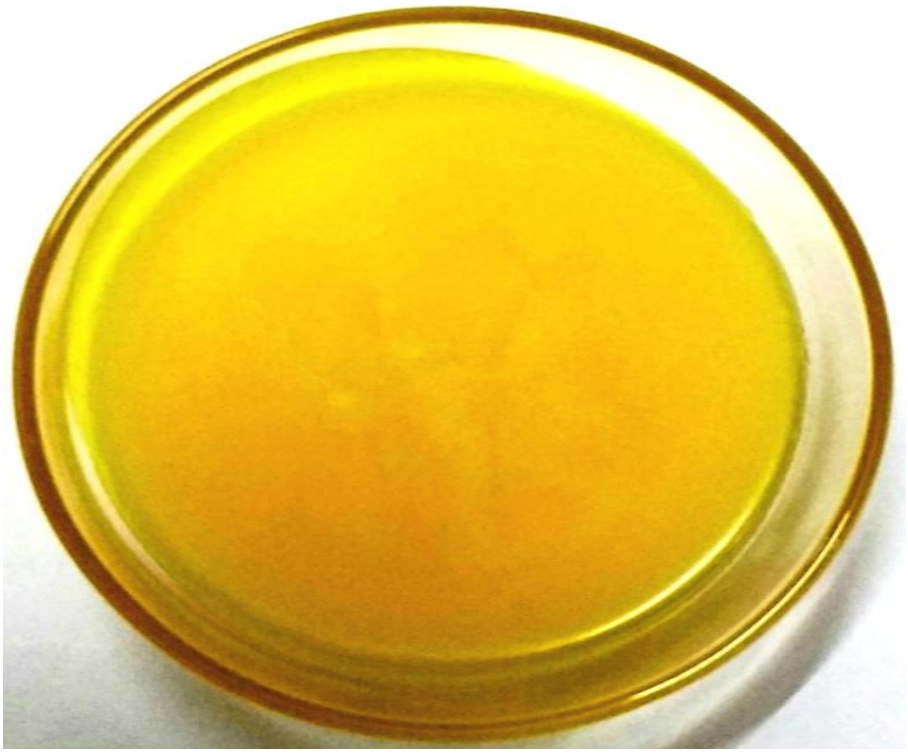
- **Treat the cause**
- **Increase the iron intake**
- **Increase iron absorption**
    - Overall correction of nutrition with food articles rich in iron is most important. Meat, liver, green leafy vegetables, onion, grapes, and jaggery are good source of iron.
    - There are two forms of dietary iron heme and non heme.
    - Vitamin c help absorb the non heme iron. Food containing non heme iron and the vitamin C rich food are eaten at the same meal.

PREVENTION:

This is a condition which can be prevented easily by supplementing iron rich foods. This involves the following measures:

- Eating diet with a wide variety of iron containing food
- Fortification of articles of food such as bread, salt, wheat and flour
- Improvement of personal hygiene
- Avoiding open air defecation (ankylostomiasis)
- Wearing foot wear
- Frequent deworming
- Iron supplementation during pregnancy, lactation and childhood.

TRIAL MEDICINE



CHITRAMUTTI NEI

INGREDIENTS OF CHITRAMUTTI NEI

Terminalia chebula

Terminalia belirica

Curcuma longa

Phyllanthus Emblica

Sida cordifolia

Andrographis paniculata

COW GHEE

Madhuca longifolia

PREPARATION AND PROPERTIES OF TRIAL DRUGS

CHITRAMUTTI NEI

Ref: *Chikicha Rathna Deepam* (Page No:212, 213)

Pub*: B.Rathina Nayakar And Sons, Chennai-79,Edition-2011*

INGREDIENTS:

- ✓ Chitramutti ver (*Sida cordifolia*)
- ✓ Karimanjal (*Curcuma longa*)
- ✓ Kadukkai (*Terminlia chebula*)
- ✓ Thandrikkai (*Terminalia belirica*)
- ✓ Nellivatral (*Phyllanthus emblica*)
- ✓ Nilavembu (*Andrographis paniculata*)
- ✓ Illupai verpattai (*Madhuca longifolia)*
- ✓ Cow's milk
- ✓ Ghee

Source of raw drug:

The required raw drugs are procured from a well reputed indigenous drug shop. Fresh specimen of *Chitramutti root* was collected from Siddha medicinal plant garden, Mettur, Salem, Tamil Nadu with concerned of Botanist. *Illupai ver pattai* was collected from my native place, Pondicherry. Then the raw drugs were authenticated by the concerned Pharmacognosist, SCRI, Chennai.

Purification:

Fresh specimen of *Chitramutti root, Illupai ver* pattai were dried in sunlight for 1 month. The drugs were purified and all drugs were taken in an equal quantity of 280gram.

Preparation:

The purified drugs were made into coarse powdered. The coarse powdered drugs were put in pot and 5.2 lit of water was added and made into a half the amount(2.5lit). Then

cow's milk 5 lit, ghee 1.5lit were added to the above decoction and heated upto ghee form and then filtered it.

Drug Storage:

The trial drug is stored in clean dry air tight container and it is dispensed to the patients in air tight bottle.

Dose: 4-5 ml, Twice a day

Duration: 28 days.

PROPERTIES OF TRIAL DRUG

சிற்றாமுட்டி

Botanical Name **:** *Sida cordifolia*

English Name **:** Yellow Sticky Mallon

Family **:** Malvaceae

Suvai ***:*** *Thuvarpu*

Thanmai ***:*** *Thatpam*

Pirivu ***:*** *Inippu*

Part used *:* Whole plant

பொதுகுணம்:

"அத்தி சுரமுதல் அனந்தசுரம் பித்தமும் போம்
மெத்த விழிக்கொளியாம் வீறுதயி- லத்திற்காம்
நற்றா மரைத்திருவு நாடு மெழிற்றிருவே!
சிற்றாமுட் டித்துரைச் செப்பு."

-அகத்தியர் குணவாகடம்

Chemical constituents:

Ephedrine, Pseudoephedrine, malvalic and coronaric acid, Fatty acids, Saponine, Indole alkaloids, Palmitic acids, Stearic and β - sitosterol.

Actions:

Emollient, Tonic, Stomachic, Astringent.

Pharmacological activities:

Anti oxident.Anti- helminthic, Hepatoprotective, anti – microbial, Wound healing.

கறிமஞ்சள்

Botanical Name : *Curcuma longa*

English Name : Turmeric

Family : Curcurbitaceae

Suvai *: Kaarpu, Kaippu*

Thanmai *: Veppam*

Pirivu *: Kaarpu*

Part used *:* Rhizome

பொதுகுணம்:

“பொன்னிறமாம் மேனி புலானாற்ற மும்போகும்
மன்னு புருட வசியமாம்- பின்னியெழும்
வாந்திபித்த தோடமையம் வாதம்போந் தீபனமாங்
கூர்ந்தமஞ்ச ளின்கிழங்குக்கு”

-அகத்தியர் குணவாகடம்

Chemical constituents:

Ar- turmerone, α turmerone, β turmerone, β ocimene, α phellandrene, Terpinolene, 1,8 Cineole, Undecanol, p- cymene.

Actions:

Aromatic, stimulant, carminative, Stomachic, Tonic

Pharmacological activities:

Anti tumour, Anti fungal, .Anti- helminthic, Hepatoprotective, anti – microbial, Wound healing, Anti oxident.

கடுக்காய்த்தோல்

Botanical Name : *Terminalia chebula*

English Name : Chebulic Myrobalan

Family : Combretaceae

Suvai *: Kaarpu,*

Thanmai *: Veppam*

Pirivu *: Innipu*

Part used *:* Fruits

பொதுகுணம்:

“தாடை கழுத்தக்கி தாலு குறியிவிடப்
பீடை சிலிபதமுற் பேதிமுடம்- ஆடையெட்டாத்
தூலமிடி புண்வாத சோணிகா மாலையிரண்
டூலமிடி போம்வரிக்கா யால்”

-அகத்தியர் குணவாகடம்

Chemical constituents:

Chebulic acid, Chebulagic acid, Corilagin, Gallic acid, Mannitol, Ascorbic acid,

Actions:

Astringent, Alternative Stomachic, Tonic

Pharmacological activities:

Anti viral, .Anti- helminthic, Hepatoprotective, anti –bacterial, Anti oxidant.

தான்றிக்காய்

Botanical Name : *Terminalia bellirica*

English Name : Belleric Myrobalan

Family : Combretaceae

Suvai *: Thuvarpu*

Thanmai *: Veppam*

Pirivu *: Innipu*

Part used *:* Fruits

பொதுகுணம்:

‘‘ஆணிப்பொன் மேனிக் கழகும் ஒளியுமிகும்
கோணிக்கொள் வாதபித்தக்கொள்கைபோம்-தானிக்காய்
கொண்டவர்க்கு மேகமறும் கூறா அனற்றணியும்
கண்டவர்க்கு வாதம்போம் காண்’’

-அகத்தியர் குணவாகடம்

Chemical constituents:

Glucoside, Gallo-tannic acid, Ellagic acid, Gallic acid, Ethyl gallate, Galloyl glucose, Chebulagic acid, β- sitosterol, Mannitol,Glucose.

Actions:

Astringent, Expectorant, Laxative, Tonic

Pharmacological activities:

Anti Diarrhoeal, .Anti- helminthic, Hepatoprotective, anti –microbial, Anti oxidant, Wound healing, Immunomodulatory, Anti pyretic.

நெல்லிவற்றல்

Botanical Name **:** *Phyllanthus emblica*

English Name **:** Indian Goseberry

Family **:** Euphorbiaceae

Suvai ***:*** *Thuvarpu, pullipu,Innipu*

Thanmai ***:*** *Thatpam*

Pirivu ***:*** *Innipu*

Part used *:* Fruits

பொதுகுணம்:

‘‘நெல்லிக்காய்க் குப்பித்தம் நீங்கு மதன்புளிப்பால்
செல்லுமே வாதமதிற் சேர்துவரால்-சொல்லுமையம்
ஓடுமிதைச் சித்தத்தில் உன்ன அனலுடனே
கூடுபிற மேகமும் போங் கூறு’’

-தேரன் குணவாகடம்

Chemical constituents:

Vitamin C- 600mg/100g, Iron- 1.2mg / 100mg, Glucoside, Ellagic acid, Gallic acid, 1-0 Galloyl-beta-D- glucose, Chebulagic acid, Chebulinic acid, Quercetin, Corilagin.

Actions:

Refrigerant, Diuretic, Laxative, Carminative, Stomachic.

Pharmacological activities:

Cardio protective,.Anti- helminthic, Hepatoprotective, anti –microbial,Memory enhancer, Hair growth property, Immunomodulator, Anti pyretic.

நிலவேம்புச் சமூலம்

Botanical Name **:** *Andrographis paniculata*

English Name **:** Green chiretta kalmegh, Creat

Family **:** Acanthaceae

Suvai ***:*** *Kaippu*

Thanmai ***:*** *Veppam*

Pirivu ***:*** *Karppu*

Part used *:* Whole plant

பொதுகுணம்:

“வாதசுரம் நீரேற்றம் மாற்றுஞ் சுரதோடே
காதமென ஓடக் கடியுங்காண்-மாதரசே!
பித்த மயக்கறுக்கும் பின்புதெளி வைக்கொடுக்கும்
சுத்தநில வேம்பின் தொழில்”

-அகத்தியர் குணவாகடம்

Chemical constituents:

Andrographide 1, 14-Deoxyandrographide 3,Neoandrographide, Andrographiside 8, Homoandrographolide, Andrographosterol, α sitosterol, andrographin.

Actions:

Astringent, Stimulant, Alternative, Tonic

Pharmacological activities:

Anti- helminthic, Hepatoprotective, anti –bacterial, Anti oxidant, Immunological, Anti pyretic.

இலுப்பை வேர்ப்பட்டை

Botanical Name : *Madhuca longifolia*

English Name : South Indian Mahua

Family : Sapotaceae

Suvai *: Thuvarpu*

Thanmai *: Thatpam*

Pirivu *: kaarppu*

Part used *:* Root Bark

பொதுகுணம்:

“புண்ணும் புரையுமறும் போதத் துவர்ப்பாகும்
எண்ணுமகக்கடுப்பி ருக்குமோ-பெண்ணே கேள்
நீரிழிவு மேகும் நெடுமோமை மூலத்தாள்
போரடர்க டுப்பிரத்தம் போம்”

-அகத்தியர் குணவாகடம்

Chemical constituents:

β-D-Glucoside of β-sitosterol, Erythrodiol 3β-caprylate, Oleanolic acid, stigmasterol

Actions:

Astringent, Alternative, Stimulant, stomachic, Tonic

Pharmacological activities:

Anti- helminthic, Hepatoprotective, anti –microbial, Anti oxidant, Wound healing, Anti pyretic.

பசுவின் பால்

வேறுப்பெயர்:

பயம், கீரம், சுதை, பயசு, பாகு, அமுது, துத்தம் சாறு.

பொதுகுணம்:

“பாலர் கிழவர் பழஞ்சுரத்தோர் புண்ணாளி
சூலையர் மேகத்தோர் துர்பலத்தோர் ஏலுமிவர்
எல்லார்க்கு மாகும் இளைத்தவர்க்குஞ் சாதகமாய்
நல்லாய் பசுவின்பால் நாட்டு”

USES:

- Sweet in taste, heavy to digest, has coolent effect on the body.
- Improves immunity of the body
- Nourishes the boy tissues
- Does rejuvenation, increase life expectancy
- Improves intelligence, strength.
- Assist in easy movement of intestines.
- Relives tiredness, dizziness, excessive thirst, hunger

COW GHEE

Suvai ***:*** *Inippu*

Thanmai ***:****Thatpam*

Pirivu ***:****Inippu*

Qualities **:**light, substle

Actions on the doshas:

Tridoshaic – balance vatha, pitha kabha.

Chemical composition:

Cow Ghee's is abdudant in saturate fatty acids. It contains approximately 8% saturated fatty acids which make it easily digestible.The digestible co-efficient or the rate absorption is 96% which is better than any other animal or vegetable fat.

It contain triglyceride, diglycerides, monoglyceride, phospholipids contains beta carotene 600 IU and vitamin E which are known as Anti oxidant.

Action:

Anti fungal, Anti oxidant, anti aging, Anti bacterial, Antiviral

Medicinal qualities:

- It increase our capacity to digest food but also our capacity to absorb and assimilate it
- It is cooling, tasty, tonic, appetizer.
- It directly nourishes our immune system, as well as our life force and all of our tissues.
- It increases intelligence, refines the intellect and improves the memory.
- Ghee increase the strength, luster and beauty of the body.
- It can stimulate secretion of stomach acids and thus helping in the digestive process.
- It increase the absorbability of vitamins and minerals and thus help to improve overall health.it balances all Agni (digestive fires).

4. MATERIALS AND METHODS

STUDY DESIGN:

An open clinical trial on *Paandu Noi* was carried out in the OP of P.G *Kuzhanthai Maruthuvam* Department attached to Aringnar Anna Hospital of Indian Medicine, Chennai-106 during the period 2015 – 2017.

The study was approved by **Institutional Ethical Committee (IEC)** and approval number is **GSMC-CH-ME-4/019/2015.**

POPULATION AND SAMPLE:

The population consists of all patients satisfying the inclusion and exclusion criteria mentioned below. Sample consists of *Paandu Noi* patients who were attending the OP of Aringnar Anna Hospital, Arumbakkam, Chennai -106.

SAMPLE SIZE:

The study is conducted in 40 selected patients of both genders between age groups of 3 – 12 years.

INCLUSION CRITERIA:

- Age: 3 -12 years; Sex – both male & female children
- Hb level between 7 – 11gms
- Sign of pallor of skin, conjunctiva, mucous membrane, nail beds
- Anorexia, fatigue, dyspnoea on exertion, palpitation
- Angular stomatitis
- Loss of memory, lack of interest, frontal headache
- Worm infestation
- Patients who undergo routine blood investigation

EXCLUSION CRITERIA:

- Known H/O of Metabolic disorder
- Known H/O of Haemolytic anaemia
- Known H/O of Thalessemia
- Patient with chronic disease
- Patient with any other serious illness.

WITHDRAWAL CRITERIA:

- Exacerbation of symptoms.
- The subject develops adverse drug reactions and adverse event they will be withdrawn from the trial.
- Patient turned unwilling to continue in the course of clinical trial.

EVALUATION OF CLINICAL PARAMETERS:

Patients are clinically evaluated by using the following parameters

History taking:

Age, occupation, Socio economic status, complaints and duration, past illness, family history, and personal habits were recorded in the case sheets for every patients during his / her first visit to OP.

INVESTIGATIONS:

Blood:

TC, DC, ESR, Hb

URINE:

Albumin, Sugar,Deposit

SPECIFIC IVESTIGATIONS:

Blood:

PCV, MCV, MCH, MCHC, Total RBC

MOTION:

Ova, Cyst, Occult blood

CLINICAL DIAGNOSIS BASED ON SIDDHA SYSTEM:

The parameters used to diagnose the disease *paandu Noi* in siddha system are as follows,

- Poriyal aridhal
- Pulanaal aridhal
- Vinaadhal
- Uyirthathukkal
- Udalthadhukkal
- Envagaithervu

METHODOLOGY OF TREATMENT:

Study Enrollment:

Patient reporting at the OPD associated with clinical features of Pallor in conjuctivia & mucous membrane, Headache, Fatigue, Loss of appetite, worm infestation, dyspnoea on exertion, constipation are chosen for enrolment based on the inclusion criteria. The patients who are enrolled are informed about the study trial drug *Chitramutti Nei*, possible outcomes and the objectives of the study in the language and terms understandable to them and then informed consent/assent would be obtained from the patient/patients parent using consent/Assent form.

Conduct of the Study:

On the first day onwards the trial drug "*Chitramutti Nei*" (InternaL) will be given. The trial drug will be given in the OPD department of Kuzhanthai Maruthuvam, GSMC, Chennai. The patients will be asked to have a regular follow up in the OPD

department once in 7days. In each and every visit the clinical assessment will be recorded in the prescribed proforma.The laboratory investigation will be done before and after treatment and recorded in the prescribed format.

Data collection forms:

Required information will be collected from each patient by using following forms.

Form I : Screening and selection proforma.

Form II : History taking proforma.

Form III : Clinical assessment proforma.

Form IV : Clinical assessment during and after trial.

Form V : Laboratory Investigation proforma.

Form VI : Informed consent/Assent form.

Form VII : Withdrawal form.

Form VIII : Patient information sheet.

Data Analysis:

After enrolling the patients in the study, a separate file for each patient will be maintained and all forms will be kept in the file. Whenever the patient visits OPD during the study period, necessary entries will be made in the assessment forms.

The data entries and adverse events if any will be monitored by the Head of the Department.

OUTCOME OF TREATMENT:

Primary Outcome:

Primary outcome is mainly assessed by reduction in clinical symptoms and by Raising Hb above 3 g/dl and comparing the following parameters before and after treatment.

Secondary Outcome:

Secondary outcome is assessed by comparing the safety parameters before and after treatment.

Adverse Effect and Serious Effect Management:

If the trial patient develops any adverse reactions the patient will be referred to the Pharmacovigilance department of SCRI and documented. For any adverse effect the investigator will give the proper management in the OPD.

ETHICAL ISSUES

1. Informed consent/Assent will be obtained from the patient/patient's parent or guardian after explaining about the clinical trial in an understandable language.
2. After the consent/Assent of the patient or patient's parent(through consent/Assent) if they fit in the criteria they will be enrolled in the study.
3. Treatment will be provided free of cost.
4. Concomitant medicines will be used if there is any need.
5. The patients who are excluded (as per the exclusion criteria)will be refer to OPD.

RESULTS AND OBSERVATION

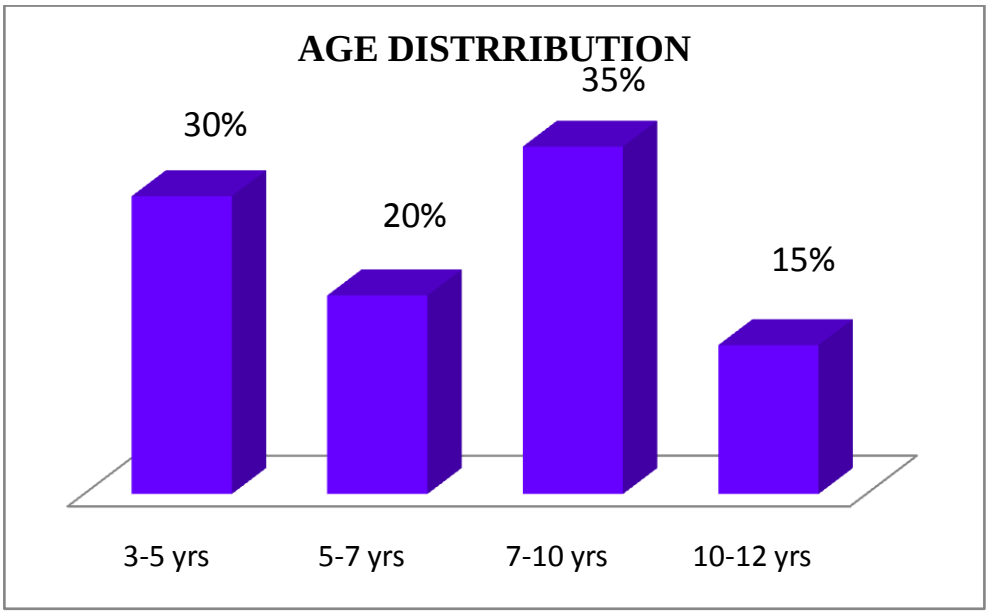
A total number of 40 child patients with signs and symptoms of ***PaanduNoi***attending PG-IV*, KuzhanthaiMaruthuvam,* Out Patient Department in Govt. Siddha Medical College attached to Aringnar Anna Hospital during 2015- 2017 were observed in the present study. The observations were made and tabulated with regards to the following features:

1. **Age Distribution**
2. **Gender Distribution**
3. **Socio-Economic status**
4. **Aetiological factor**
5. **Dietary habits**
6. **Seasonal reference**
7. **Reference to Thinai**
8. **UyirThathukkal**
9. **Udarthathukkal**
10. **Envagaithervugal**
11. **Neikkuri**
12. **Clinical prognosis**
13. **Results after treatment**

The observation recorded are given below in tabular form

AGE DISTRIBUTION

S.NO.	AGE	NO. OF CASES	PERCENTAGE
1	3-5 yrs	12	30%
2	5-7 yrs	8	20%
3	7-10 yrs	14	35%
4	10-12 yrs	6	15%

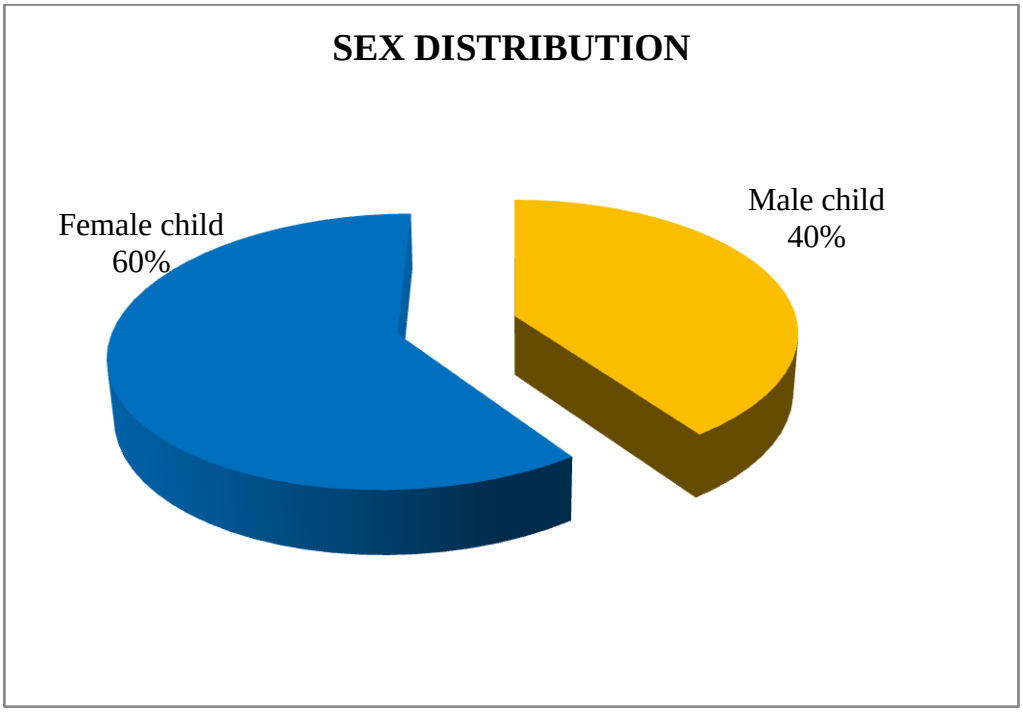


Inference

The above table indicates that children coming under 3-5 years of age group were 12(30%), 5-7 years were 8(20%), 7-10 years were 14(35%), 10-12 years were 6 (15%) respectively.

SEX DISTRIBUTION

S.NO.	SEX	NO. OF CASES	PERCENTAGE
1	Male child	16	40%
2	Female child	24	60%

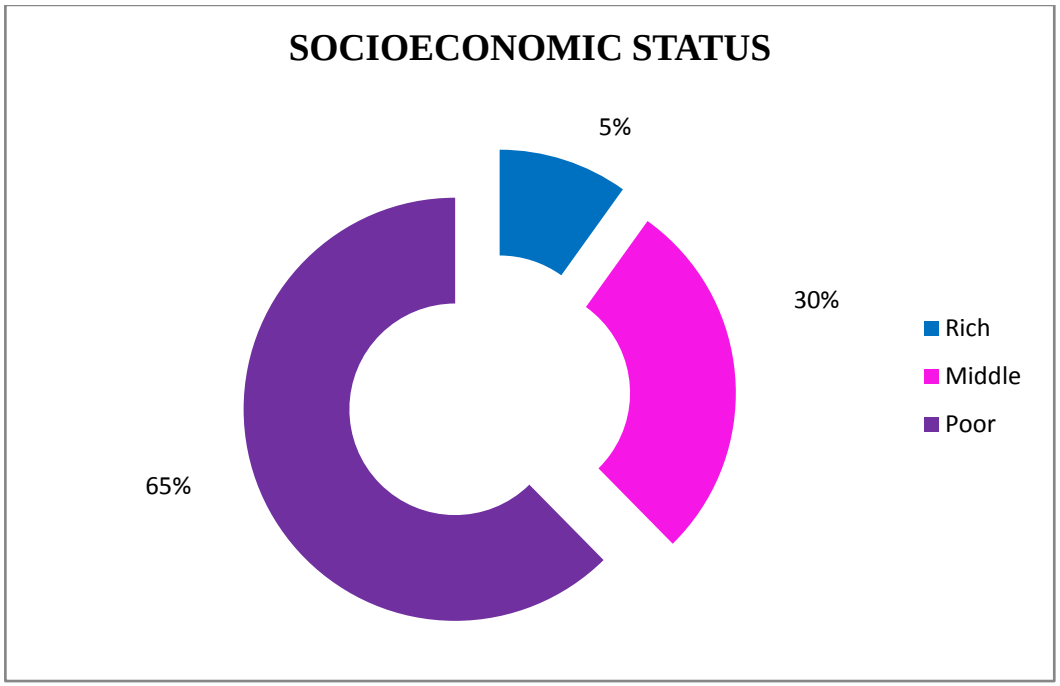


Inference

Among the 40 cases for this present study, 24 (60%) children were female and 16 (40%) children were male. According to modern theory there is no apparent sex prediction.

SOCIO ECONOMIC STATUS

S.NO.	STATUS	NO. OF CASES	PERCENTAGE
1	Rich	2	5%
2	Middle	12	30%
3	Poor	26	65%

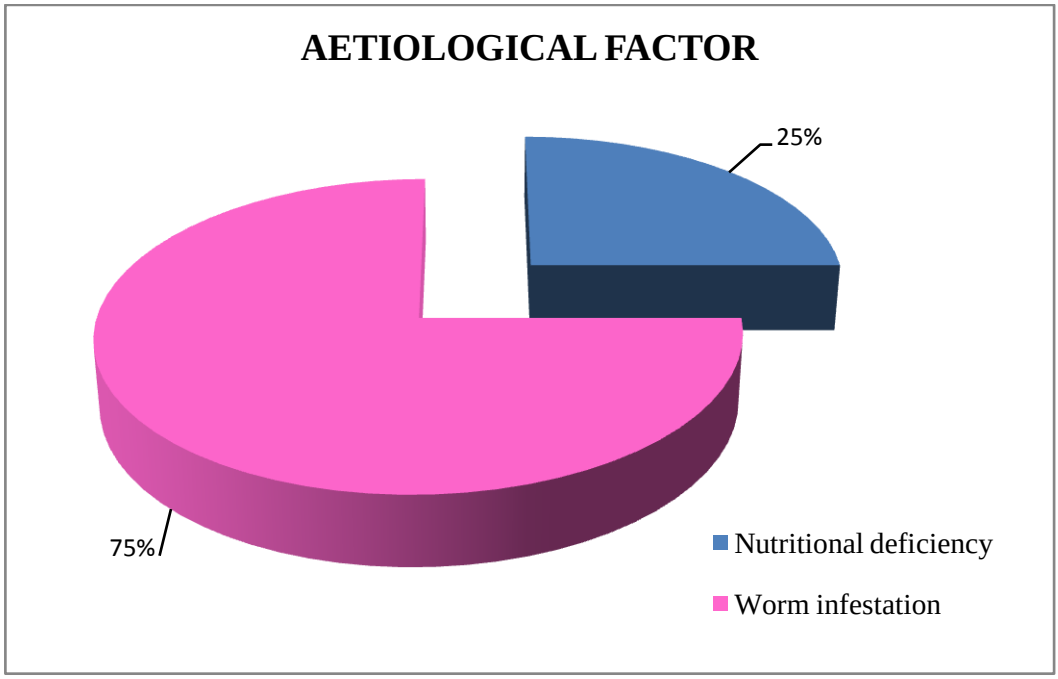


Inference:

Regarding socio-economic status, 26(65%) cases were belong to poor status, 12(30%) cases were belong to middle class and 2(5%) cases belong to high class.

AETIOLOGICAL FACTOR:

S.NO	AETIOLOGY	NO OF CASES	PERCENTAGE
1	Nutritional deficiency	10	25%
2	Worm infestation	30	75%

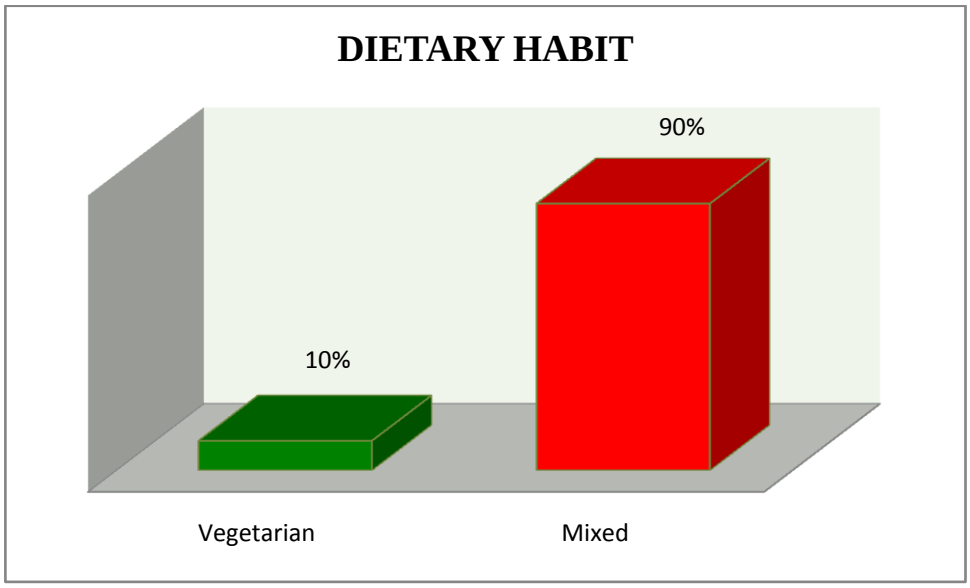


INFERENCE:

Among 40 cases, 10 (25%) cases were due to nutritional deficiency, 30 (75%) cases were due to Worm infestation

DIETARY HABITS:

S.NO	DIET	NO. OF CASES	PERCENTAGE
1.	Vegetarian	4	10%
2	Mixed	36	90%

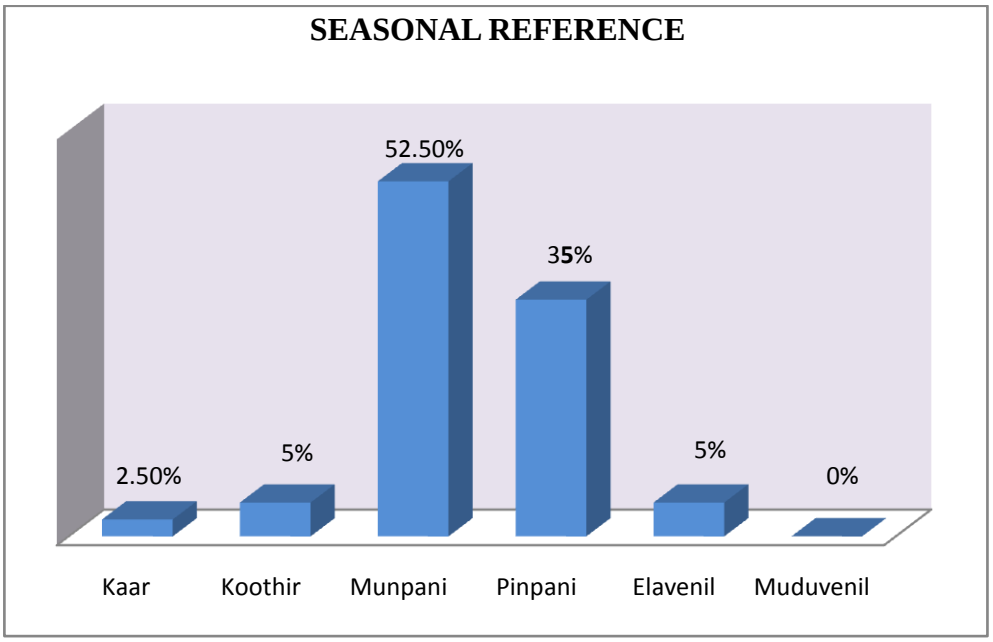


Inference:

90% belonged to mixed diet and 10% belonged to vegetarian diet habit.

SEASONAL REFERENCE:

S.NO.	KAALANGAL	NO.OF CASES	PERCENTAGE
1	Kaar(Aavani, purattasi)	1	2.5%
2	Koothir (Iypasi, karthigai)	2	5%
3	Munpani (Margazhi, Thai)	21	52.5%
4	Pinpani (Masi, Pankuni)	14	35%
5	Elavenil (Chithirai, Vaikasi)	2	5%
6	Muduvenil (Aani, Aadi)	0	0%



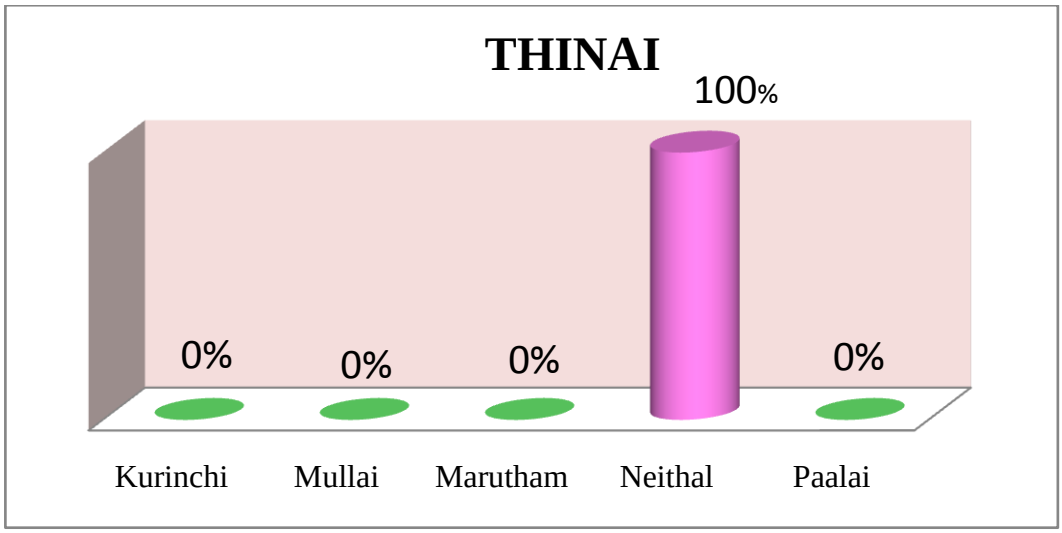
Inference

Regarding *Paruvakaalam* among 40 cases, 1(2.5%) cases were reported in Kaarkaalam, 2(5%) cases were reported in *Koothirkaalam*and *ElavenilKaalam*,

21(52.5%) cases were reported in *Munpanikaalam*, 14(35%) cases were reported in *Pinpanikaalam* and no cases were reported in *Muduvenilkaalam* respectively

REFERENCE TO THINAI:

S.NO.	NILAM	NO. OF CASES	PERCENTAGE
1	Kurinchi	0	0%
2	Mullai	0	0%
3	Marutham	0	0%`
4	Neithal	40	100%
5	Paalai	0	0%



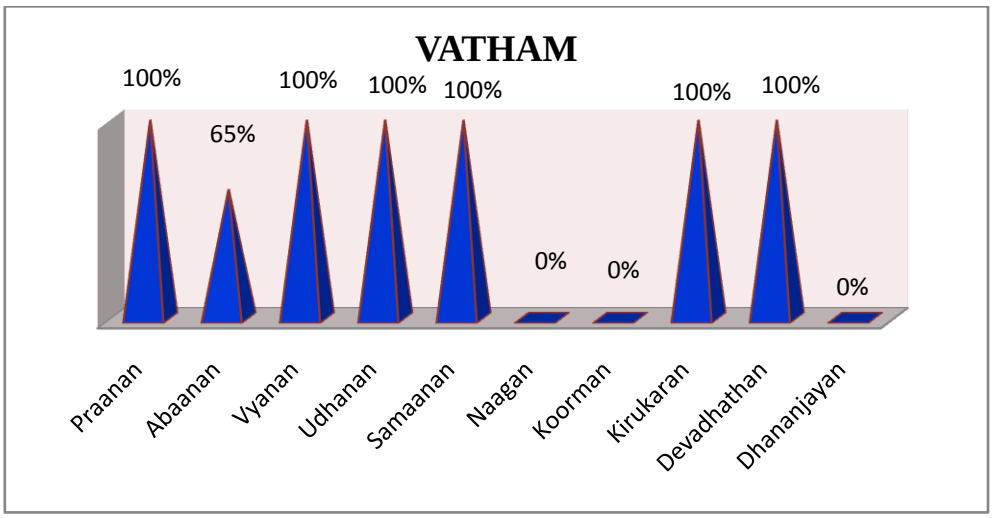
Inference

Among the 40 cases reported were from surroundings of Chennai which belongs to *Neithalnilam*.It cause increase in *pitham*

UYIR THATHUKKAL:

a. AFFECTED *VATHAM:*

S.No.	*Vatham*	No. of cases	Percentage
1	*Praanan*	40	100%
2	*Abaanan*	26	65%
3	*Vyanan*	40	100%
4	*Udhanan*	40	100%
5	*Samaanan*	40	100%
6	*Naagan*	0	0%
7	*Koorman*	0	0%
8	*Kirukaran*	40	100%
9	*Devadhathan*	40	100%
10	*Dhananjayan*	0	0%

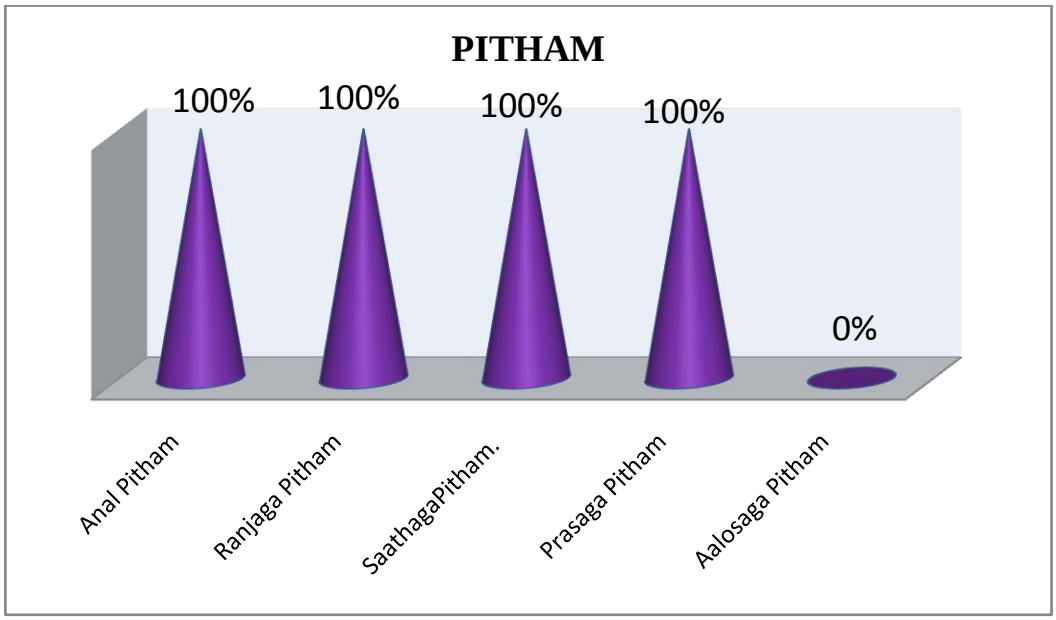


Inference:

In 40 cases, among 10 types of *Vaatham, Praanan, Viyaanan,Udhanan Samaanam, Kirukaran and Devathathan* were affected in all 40 cases (100%). *Abaanan* was affected in 26 cases(65%) respectively.

PITHAM

S.NO.	PITHAM	NO. OF CASES	PERCENTAGE
1	Anal Pitham	40	100%
2	RanjagaPitham	40	100%
3	SaathagaPitham.	40	100%
4	PrasagaPitham	40	100%
5	AalosagaPitham	0	0%

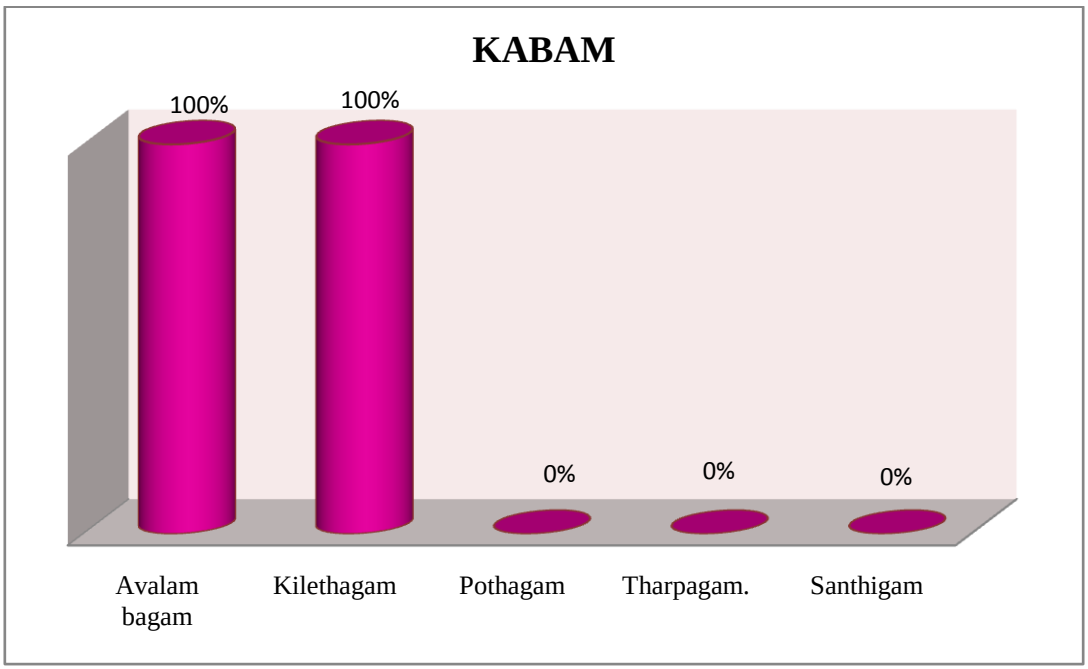


INFERENCE:

Among 5 types *of Pitham* all was affected, except *Aalosagam* in all patients.

KABAM

S.NO.	KABAM	NO. OF CASES	PERCENTAGE
1	*Avalambagam*	40	100%
2	*Kilethagam*	40	100%
3	*Pothagam*	0	0%
4	*Tharpagam.*	0	0%
5	*Santhigam*	0	0%

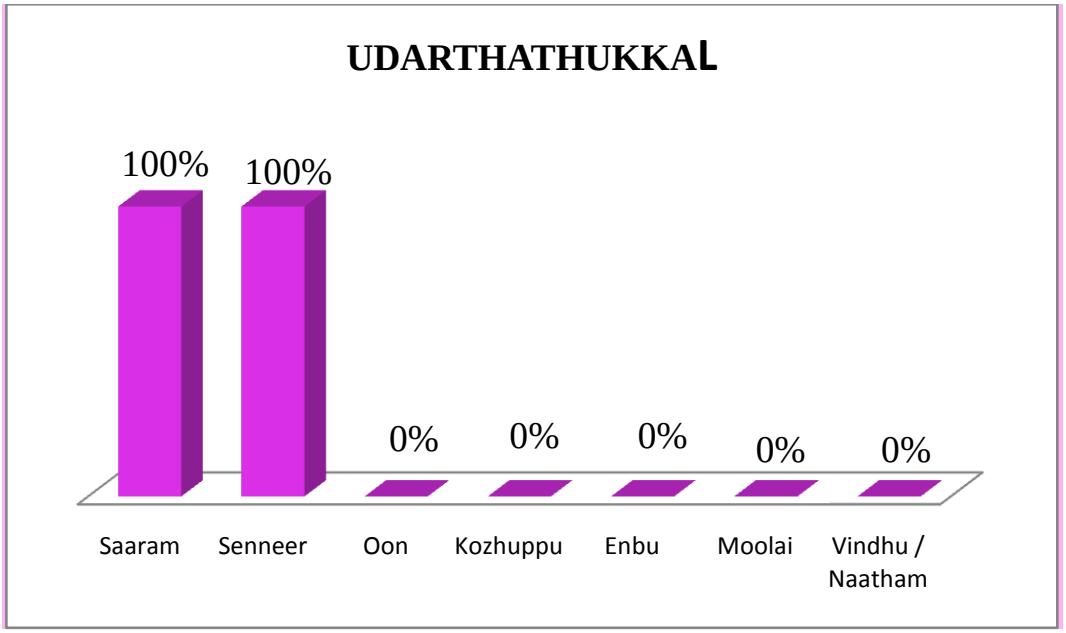


INFERENCE:

Among 40 cases, *Aavalamgam* was affected in 16 cases (40%) and *Kilathagam* was affected in all the cases.

UDARTHATHUKKAL

S.NO.	*NAME*	NO. OF CASES	PERCENTAGE
1	*Saaram*	40	100%
2	*Senneer*	40	100%
3	*Oon*	0	0%
4	*Kozhuppu*	0	0%
5	*Enbu*	0	0%
6	*Moolai*	0	0%
7	*Vindhu / Naatham*	0	0%

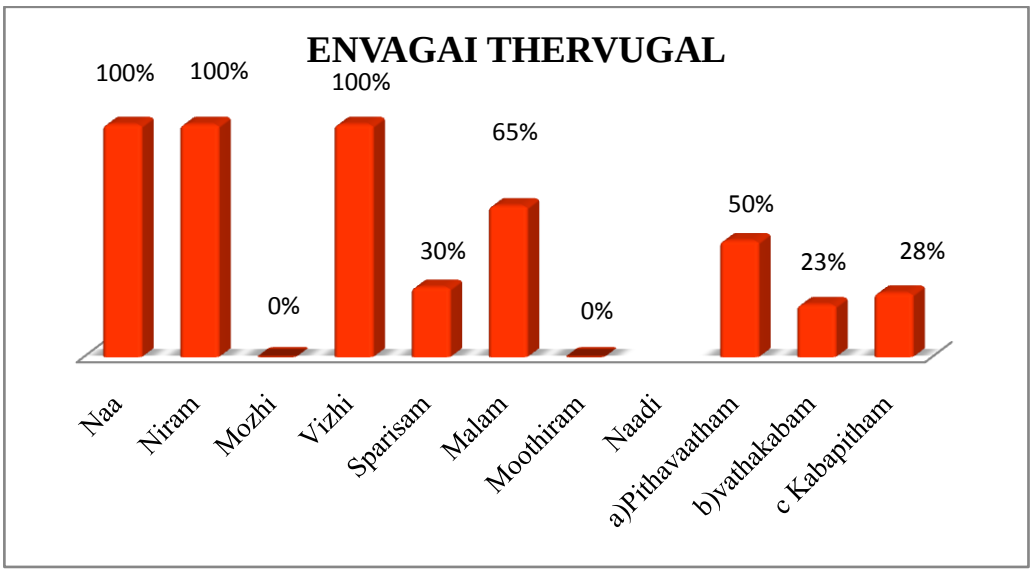


INFERENCE:

In*Udalthathukkal*, *Saaram* and *Senner* were affected in all 40(100%) cases.

ENVAGAI THERVUGAL:

S.NO.	SIDDHA PARAMETERS	NO. OF CASES	PERCENTAGE
1	*Naa*	40	100%
2	*Niram*	40	100%
3	*Mozhi*	0	0%
4	*Vizhi*	40	100%
5	*Sparisam*	12	30%
6	*Malam*	26	65%
7	*Moothiram*	0	0%
8	*Naadi*		
	a)Pithavaatham	20	50%
	b)vathakabam *c Kabapitham*	9 11	22.5% 27.5%

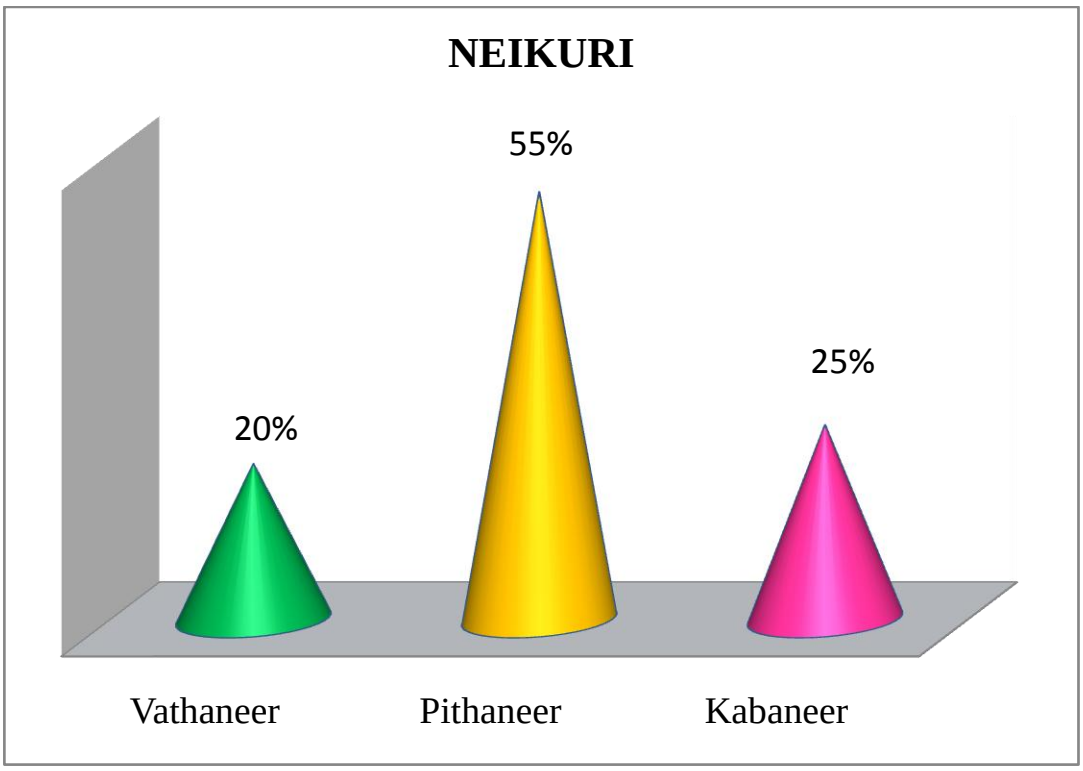


Inference:

Among the Ennvagaithervukal, *Naa, Niram and Vizhi* were affected in all cases (100%). In 26 cases (65%) *Malam*, and in 12 cases (30%) Sparism were affected and in *Naadi* 20 cases (50%) *Pithavaatham*, in 10 cases (22.5%) *vathakabam* and in 11 cases (27.5%) *Kabapitham* were affected.

NEIKKURI

	TYPE OF NEER	CHARACTER	NO. OF CASES & PERCENTAGE
1	*Vathaneer*	*Aravenaneendal*	8(20%)
2	*Pithaneer*	*Aazhipolparavuthal*	22(55%)
3	*Kabaneer*	*Muththothunitral*	10(25%)

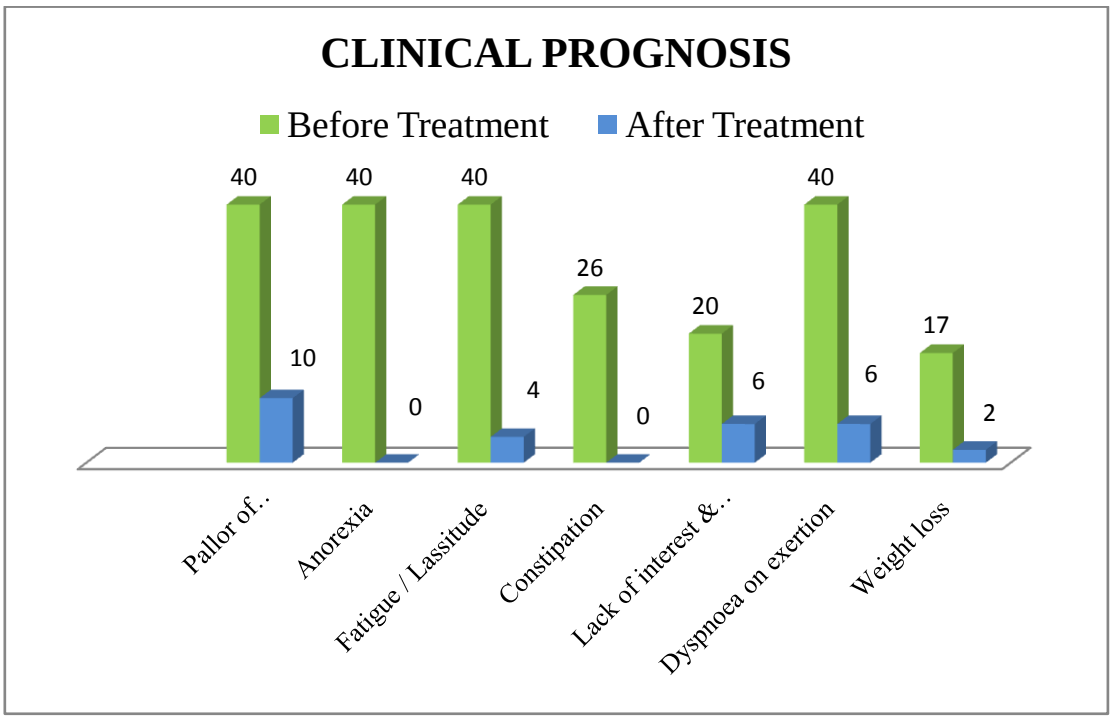


Inference

Among 40 cases, *Vathaneer*was observed in 8(20%) cases, *Pithaneer*was observed in 22(55%) cases, *Kabaneer*was observed in 10(25%) cases.

REFERENCE TO CLINICAL PROGNOSIS

S. NO	Clinical features	Before Treatment		After Treatment	
		No.of cases	Percentage	No.of cases	Percentage
1	Pallor of conjunctivae, tongue, nail beds	40	100%	10	25%
2	Anorexia	40	100%	0	0%
3	Fatigue / Lassitude	40	100%	4	10%
4.	Constipation	26	65%	0	0%
5	Lack of interest & concentration	20	50%	6	15%
6	Dyspnoea on exertion	40	100%	6	15%
7	Weight loss	17	43%	2	5%



Inference

The above table reveals that, among all the 40 cases Anorexia was reduced, pallor of conjunctivae, tongue nail beds was reduced in 30 cases among 10, fatigue was reduced in 36 cases among 40, constipation was reduced in all cases, lack of interest / concentration was reduced in 14 cases among 20, dyspnoea on excertion was reduced in 34 cases among 40, weight loss was reduced in 15 cases among 17.

RESULTS AFTER TREATMENT

Results were observed on the basis of two main criteria. One on tbe basis of clinical improvement and the other on the results derived from the blood picture.

a. Results from clinical improvement

Good, Moderate, Mild improvements were assessed on the basis of relieved signs and symptoms as follows.

Good improvement

- Anorexia – nil
- Lassitude – nil
- Pallor of conjunctiva and nail beds – nil
- Dyspnoea on exertion – nil
- Lack of interest / concentration – improved

Moderate improvement

- Anorexia – nil
- Lassitude – nil
- Pallor of conjunctiva and nail beds – improved
- Dyspnoea on exertion – moderately improved
- Lack of interest / concentration – slightly improved

Mild improvement

- Anorexia – nil
- Lassitude – present or absent
- Pallor of conjunctiva and nail beds – present
- Dyspnoea on exertion – present
- Lack of interest / concentration – present

Among the 40 cases, 27 cases assessed as good improvement, 8 cases assessed as moderate improvement, and 5 cases assessed as mild improvement.

b. Results derived from the blood picture

Good: Increase in Hb level between 3gms/dl and above after treatment .

Moderate: Increase in Hb level between 2gms/dl to 2.9 gms/dl after treatment

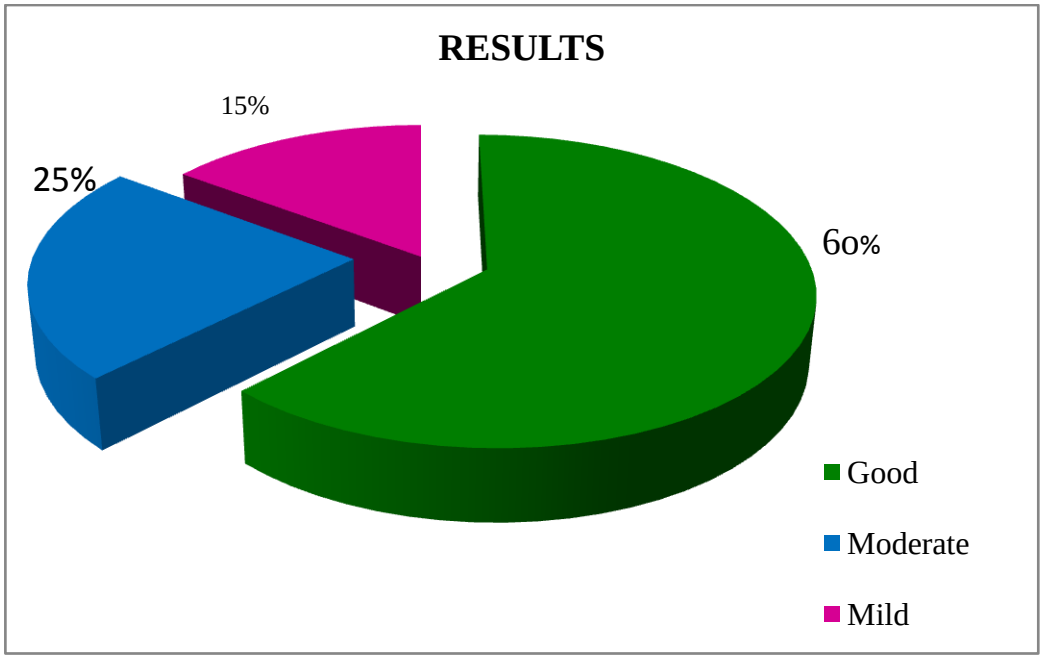
Mild: Increase in Hb level between 0.5gms/dl to 1.5gm/dl after treatment

Among the 40 cases studies the result were observed as follows

S.NO	RESULTS	NO.OF CASES	PERCENTAGE
1	Good	24	60%
2	Moderate	10	25%
3	Mild	6	15%

Inference:

Among the 40 cases treated, 24 cases (60%) showed good result, 10 cases (25%) showed moderate result and 6 cases (15%) showed mild result. The results were based on clinical improvement and results derived from the blood picture.



CASE SUMMARY OF THE PATIENTS

S.NO	OP.NO	NAME	AGE/ SEX	REMARKS
1	8512	Logithashva	6 /MC	MILD
2	881	Harini	5/ FC	GOOD
3	1024	Jayalakshmi	9/ FC	GOOD
4	5230	Nishanthini	12/FC	MILD
5	5251	Suganthan	6/MC	MODERATE
6	5587	Sham prabhakaran	8/MC	MODERATE
7	5569	Jeevalakshmi	12/ FC	GOOD
8	5567	Thamaraiselvi	9/FC	GOOD
9	6096	Lakshya	4/FC	GOOD
10	6204	Parameshwari	10/ FC	MODERATE
11	7293	Kaviya	4/FC	GOOD
12	7341	Naveenshiva	5/MC	GOOD
13	7560	Yuvashree	12/ FC	MILD
14	7479	Tamilselvam	8/MC	MODERATE
15	8111	Kirthika	4/FC	MILD
16	8291	Joseph	7/MC	GOOD
17	8903	Sherlin	5/MC	GOOD
18	179	Shemirna	12/FC	GOOD
19	4172	Sakithi	5/FC	GOOD
20	4228	Merlin Jones	9/FC	GOOD

S.NO	OP.NO	NAME	AGE/ SEX	REMARKS
21	5412	Pavithra	6/FC	MILD
22	6626	Jayabharathi	8/FC	GOOD
23	7119	Harikrishnan	8/MC	GOOD
24	12	Sondariya	8/FC	MODERATE
25	9897	Jagatheshkumar	10/MC	MODERATE
26	234	Devakar	3/MC	MODERATE
27	252	Hariba	9/FC	MODERATE
28	685	Uthrapathi	6/MC	GOOD
29	732	Pooja	8/FC	MODERATE
30	749	Lithisha	3/FC	GOOD
31	1178	Ariys	3/MC	MILD
32	2706	Shamsundar	9/MC	GOOD
33	3470	Nithilash	8/MC	GOOD
34	3971	Thiyaammi	6/FC	GOOD
35	8470	Jaganan	7/MC	GOOD
36	9460	Sumaiya	12/FC	GOOD
37	9889	Harrisraj	11/MC	MODERATE
38	3857	Anika	7/FC	GOOD
39	8616	Kaviyashree	5/FC	GOOD
40	8681	Saitharun	4/MC	GOOD

LABORATORY INVESTIGATION REPORT OF THE PATENTS

S.No.	OP.No.	Age / Sex	Before Treatment				After Treatment				ESR (mm)				Urine Analysis					
			TC	DC			TC	DC			BT		AT		BT			AT		
				P%	L%	E%		P%	L%	E%	½ Hr	1 Hr	½ Hr	1 Hr	Alb	Sug	Dep	Alb	Sug	Dep
1.	8512	6/MC	7400	56	42	2	7900	57	43	3	13	28	9	6	N	N	N	N	N	N
2.	881	5/FC	8900	43	50	7	9100	45	52	4	5	20	2	3	N	N	N	N	N	N
3.	1024	9/FC	9700	62	31	6	9900	63	33	3	15	20	8	12	N	N	N	N	N	N
4.	5230	12/FC	8300	49	45	6	8500	51	46	3	12	30	6	18	N	N	N	N	N	N
5.	5251	6/MC	12300	68	26	6	12500	64	24	4	4	10	2	7	N	N	N	N	N	N
6.	5587	8/MC	15000	69	26	4	15400	65	22	3	3	12	3	7	N	N	N	N	N	N
7.	5569	12/FC	8000	56	39	5	8700	55	38	4	8	18	6	15	N	N	N	N	N	N
8.	5567	9/FC	7300	47	45	8	7600	45	43	3	5	10	3	9	N	N	N	N	N	N
9.	6096	4/FC	11400	30	61	9	11600	28	59	5	4	15	2	5	N	N	FEC	N	N	N
10.	6204	10/FC	7200	53	40	4	7600	50	42	8	25	45	16	27	N	N	N	N	N	N
11.	7293	4/FC	12000	41	53	6	12300	40	52	4	4	12	3	9	N	N	N	N	N	N
12.	7341	5/MC	6200	46	45	9	7200	48	43	3	5	14	3	12	N	N	N	N	N	N
13.	7560	12/FC	15000	62	22	5	15300	53	23	4	4	12	2	5	N	N	N	N	N	N
14.	7479	8/MC	10700	66	26	8	10900	64	28	8	10	24	9	16	N	N	N	N	N	N
15.	8111	4/FC	14000	71	23	6	14200	65	24	1	5	12	3	9	N	N	N	N	N	N
16.	8291	7/MC	11000	61	34	5	11000	59	35	4	8	15	6	12	N	N	N	N	N	N
17.	8903	5/FC	12000	50	42	8	12100	52	44	5	7	16	5	10	N	N	N	N	N	N
18.	179	12/FC	10700	55	36	9	10800	55	41	4	5	15	3	9	N	N	N	N	N	N
19.	4172	5/FC	5600	60	33	7	7000	60	34	4	16	24	10	18	N	N	FP	N	N	N
20.	4228	9/FC	8700	44	50	6	9200	55	41s	6	14	22	9	16	N	N	N	N	N	N

BT- Before Treatment, AT- After Treatment, N-Nil, TC-Total Blood Count, DC-Differential Blood Count,P-Polymorphs, L-Leucocytes, E-Eosinophils, ESR-Erythocyte Sedimentation Rate, mm-Milimeter, Hb-Hemoglobin, Alb-Albumin, Sug-Sugar, Dep-Deposits, FEC-Few Epithelial Cells, FP- Few pus cell

S.No.	OP.No.	Age / Sex	Before Treatment				After Treatment				ESR (mm)				Urine Analysis					
			TC	DC			TC	DC			BT		AT		BT			AT		
				P%	L%	E%		P%	L%	E%	½ Hr	1 Hr	½ Hr	1 Hr	Alb	Sug	Dep	Alb	Sug	Dep
21.	5412	6/FC	16000	69	26	5	16200	65	32	3	4	15	3	10	N	N	N	N	N	N
22.	6626	8/FC	15200	65	30	5	15300	63	34	3	12	24	8	16	N	N	N	N	N	N
23.	7119	8/MC	8500	45	46	4	900	54	43	3	4	10	3	7	N	N	N	N	N	N
24.	12	8/FC	6700	51	40	9	8500	51	46	2	8	16	6	10	N	N	N	N	N	N
25.	9897	10/MC	8000	44	47	7	9500	55	41	4	2	8	2	2	N	N	N	N	N	N
26.	234	3/MC	9500	43	49	8	10000	49	47	4	7	15	6	12	N	N	N	N	N	N
27.	252	9/FC	6400	55	37	8	8000	60	36	4	7	15	6	12	N	N	N	N	N	N
28.	685	6/MC	19000	73	23	4	16000	62	26	3	12	22	8	14	N	N	N	N	N	N
29.	732	8/FC	5700	35	57	8	7500	44	51	4	8	18	6	16	N	N	N	N	N	N
30.	749	3/FC	7200	37	55	8	8500	38	57	5	22	40	18	20	N	N	N	N	N	N
31.	1178	3/MC	8000	40	53	7	9700	47	52	1	10	25	7	16	N	N	N	N	N	N
32.	2706	9/MC	7200	64	30	6	9000	66	26	8	5	12	3	9	N	N	N	N	N	N
33.	3470	8/MC	8000	41	50	9	9800	41	51	8	5	15	3	12	N	N	N	N	N	N
34.	3971	6/FC	10800	53	41	6	10600	55	41	6	12	20	7	15	N	N	N	N	N	N
35.	8470	7/MC	7400	61	33	6	8400	62	31	7	3	10	3	7	N	N	N	N	N	N
36.	9460	12/FC	7400	50	44	6	9000	52	46	2	7	15	4	13	N	N	N	N	N	N
37.	9889	11/MC	8300	46	45	9	9200	45	50	5	4	10	3	9	N	N	N	N	N	N
38.	3857	7/FC	8100	57	37	6	9700	558	37	5	7	15	5	11	N	N	N	N	N	N
39.	8616	5/FC	6700	35	58	7	8200	37	58	5	18	37	15	23	N	N	N	N	N	N
40.	8681	4/MC	8300	46	45	6	9100	46	48	6	4	12	3	9	N	N	N	N	N	N

BT- Before Treatment, AT- After Treatment, N-Nil, TC-Total Blood Count, DC-Differential Blood Count, P-Polymorphs, L-Leucocytes, E-Eosinophils, ESR-Erythocyte Sedimentation Rate, mm-Milimeter, Hb-Hemoglobin, Alb-Albumin, Sug-Sugar, Dep-Deposits, FEC-Few Epithelial Cells, FP- Few pus cell

BIO CHEMICAL AND HEMATOLOGICAL REPORTS

S. No.	OP.No.	Name	Age / Sex	Hb (gms/dl)		RBC (million/ cu mm)		PCV (%)		MCV (fl)		MCM (Pg)		MCHC (gm/dl)		PBS	
				BT	AT	BT	AT	BT	AT	BT	AT	BT	AT	BT	AT	BT	AT
1.	8512	Lokithashva	6/MC	8.2	8.6	3.4	3.6	36	34	80	92	26	31	32	35	HM	NN
2.	881	Harini	5/FC	9.6	11.2	3.5	3.8	32	34	72	83	28	32	26	29	HM	NN
3.	1024	Jayalakshmi	9/FC	10.6	12.1	3.1	3.3	34	34.2	76	80	26	38	32	33	HM	NN
4.	5230	Nishanthini	12/FC	8.5	8.9	3.5	3.8	21.5	24.5	73	86	23.2	26	27	32.5	HM	HM
5.	5251	Suganthan	6/MC	8.9	10.3	3.3	3.7	29.2	31.5	69.2	78.2	23.2	27	28.5	33	HM	NN
6.	5587	Sham Prabhakaran	8/MC	9.3	10.5	3.1	3.4	17	20	68	80	27	30	26	34	HM	HM
7.	5569	Jeevalakshmi	12/FC	10.4	12	3.2	3.8	21	23.2	75	85	27	32	31.2	33.5	HM	NN
8.	5567	Thamaraiselvi	9/FC	9.6	11.2	3.7	3.9	28.2	32	70	83	23.2	27	24.2	29	HM	NN
9.	6096	Lokshya	4/FC	10.3	12	3.4	3.6	32	34	71	87	22	29	32	34	HM	NN
10.	6204	Parameshwari	10/FC	9.6	11	4	4.2	28	30	74	83	26	28	32	34	HM	NN
11.	7293	Kaviya	4/FC	9.8	11.5	3.2	3.4	32	35	76	90	24	27	32	34.5	HM	NN
12.	7341	Naveen Shiva	5/MC	9.5	11.3	2.8	3.2	34	35.6	74	89	25	28	32	33.2	HM	NN
13.	7560	Yuvashree	12/FC	8.2	8.7	2.9	3.2	31	32.4	73	86	28	32	32	34.5	HM	HM
14.	7479	Tamil Selvan	8/MC	8.9	10.2	3.2	3.7	32	34	78	88	26	30	32	34	HM	HM
15.	8111	Kirthiga	4/FC	8.5	9	3.4	3.6	22	24	73	86	24.2	28	26.2	28.2	HM	NN
16.	8291	Joseph	7/MC	10.4	12.1	4	4.2	32	34	71	84	26	29	32	34.2	HM	NN
17.	8903	Sherlin	5/FC	10.3	11.9	3.2	3.3	26	28	71	82.5	28	30.2	26	30	HM	NN
18.	179	Shemirna	12/FC	10	11.8	3.2	3.4	32	36	76	90	22	27.3	34	35	HM	NN
19.	4172	Sakithi	5/FC	10.3	12.2	3.6	3.8	20.2	26	72	83	30	34	28.5	33	HM	NN
20.	4228	Merlin Jones	9/FC	9.6	12.2	3.6	3.6	20	27	68	82	28	32	31.5	34	HM	NN

BT- Before Treatment, AT- After Treatment, PCV-Packed Cell Volume, MCV-Mean Corpuscular Volume, RBC-Red Blood Cells

MCH-Mean Corpuscular Hemoglobin, MCHC- Mean Corpuscular Hemoglobin Concentration, PBS-Peripheral Blood smear, HM-Hypochromic Microcytic, NN-Normochromic Normocytic

S. No.	OP.No.	Name	Age / Sex	Hb (gms/dl)		RBC (million/ cu mm)		PCV (%)		MCV (fl)		MCM (Pg)		MCHC (gm/dl)		PBS	
				BT	AT	BT	AT	BT	AT	BT	AT	BT	AT	BT	AT	BT	AT
21.	5412	Pavithra	6/FC	8.7	9.1	3.5	3.8	26	34	71	83	28	29	27	29	HM	NN
22.	6626	Jayabharathi	8/FC	9.5	11.2	3.4	3.7	28	32	70	81	28	30.2	22	25	HM	NN
23.	7119	Hari Krishna	8/MC	9.7	11.3	3.9	3.9	23	28	73	88	23.2	27.5	27	30	HM	NN
24.	12	Soundarya	8/FC	9.6	11	3.5	3.8	27.5	32	63	77	25	29	28.5	31.5	HM	NN
25.	9897	Jagatheshkumar	10/MC	9.2	10.5	2.8	3.3	21.5	25	71	79	24	31.2	27.2	30.2	HM	NN
26.	234	Devakar	3/MC	9.6	10.8	3.5	3.9	20.2	24	70	80	30.2	33.2	29	32.5	HM	NN
27.	252	Hariba	9/FC	9.3	10.2	3.7	3.9	30	32	72	87	30	34	32	33	HM	NN
28.	685	Uthrapathi	6/MC	10.3	12.1	3	3.3	25.2	28	70	80	24.2	28.2	29.4	33	HM	NN
29.	732	Pooja	8/FC	9.4	10.3	3.5	3.9	21.4	27.2	52.8	60.5	28.3	31.4	23.7	27	HM	NN
30.	749	Lithisha	3/FC	9.5	11.1	3.3	3.5	22	28	73	86	24	30.2	28	32	HM	NN
31.	1178	Ariya	3/MC	8.5	9	3.1	3.3	22	28.2	70	83	26	30	29	31	HM	HM
32.	2706	Sham Sundar	9/MC	10.2	11.8	3.4	3.6	23.4	26.2	51.3	59.5	26.6	32	22.1	28.2	HM	NN
33.	3470	Nithilesh	8/MC	10.3	12	3.7	3.8	24.9	30	59.5	63.5	26.9	30.2	25.3	29.5	HM	NN
34.	3971	Thiyaammi	6/FC	10.6	12.1	3.4	3.5	28.6	31.5	62.9	77	25.4	31.2	20.5	25.2	HM	NN
35.	8470	Jaganan	7/MC	10.9	12.6	3.7	3.8	25.5	29.2	60.9	76	28.2	33	21.6	27.2	HM	NN
36.	9460	Sumaiya	12/FC	10.3	12	3.2	3.7	23.7	24.2	59.6	70.2	25.1	29.2	30.9	34	HM	NN
37.	9889	Harris Raj	11/MC	9.4	10.5	2.9	3.2	21.4	22.5	52.8	66.5	28.3	33.2	23.7	29.2	HM	NN
38.	3857	Anika	7/FC	10.3	11.8	3.2	3.4	34	35.2	53.4	69.2	21.4	25.4	30.6	34	HM	NN
39.	8616	Kaviya Shree	5/FC	10	11.7	3.5	3.8	21.5	26	72	80	24	26.2	27.2	35.2	HM	NN
40.	8681	Sai Tharun	4/MC	10.5	11.3	3.2	3.5	21.4	27	56.8	70.2	28.3	32.4	28.7	33.4	HM	NN

BT- Before Treatment, AT- After Treatment, PCV-Packed Cell Volume, MCV-Mean Corpuscular Volume, RBC-Red Blood Cells MCH-Mean Corpuscular Hemoglobin, MCHC- Mean Corpuscular Hemoglobin Concentration, PBS-Peripheral Blood smear, HM-Hypochromic Microcytic, NN-Normochromic Normocytic

DISCUSSION

Paandu Noi is a clinical entity described by Siddhars and having symptoms such as loss of appetite, lassititude, pallor of skin and mucous membrane, conjunctivae, tongue, and nail beds, dyspnoea on exertion. These symptoms are identical with **Iron Deficiency Anaemia** (Hypochromic microcytic anaemia) a clinical entity described in modern medical literature.

Iron deficiency anaemia is one of the most common and widespread nutritional disorder present throughout the world and its prevelance is higher in children.but they are not completely relieved from their symptoms by other system of medicine. Hence with the help of trial medicine from Siddha system, results and observation are noted for the study.

The patients were examined based on Siddha as well as modern aspects.

All the necessary investigation were made during the study. The results obtained from their studies were discussed below for better conclusion.

Trial medicine administered was *Chitramutti Nei* – 4 – 5 ml, 2 times a day after food for 28 days.

In this study, 40 cases were selected according to the proforma with undergone investigation and treated with the trial drug *Chitramutti Nei* for 28days. The treatment investigation was done in the OPD of PG-Dept of *Kuzhanthai Maruthuvam,* Govt.Siddha Medical College attached to Arignar Anna Hospital of Indian Medicine Chennai-106, during the period 2015-2017. All the necessary investigations were carried out to all patients and trial drug were given. Daily follow up were done. All the patients were strictly advised to follow diet and peaceful lifestyle to normalize the immune mechanism.

Drug Authetication :

All the ingredients of the trial drug *Chitramutti Nei* were procured from indigenous drug shop, Park town, Chennai. Freshly specimen of *Sida cordifolia* is collected from siddha medicinal plant garden, Mettur, Salem and root bark of *Madhuca longifolia* were collected from nativity and its organoleptic characters,

Microscopic and Macroscopic examination was conducted, identified and authenticated by the concerned pharmacogononist,SCRI, Chennai.

Pre clinical screenings:

Biochemical Analysis:

Qualitative Analysis of the trial drug revealed the presence of iron, chloride, calcium, starch, reducing sugar.

Phytochemical Analysis:

The phytochemical analysis of the trial drug shows that the drug contains Glycosides, Carbohydrates, Coumarins, Phenols.

Physico chemical Analysis:

Loss on drying at 105°c	-	8.66%
Total ash	-	2.11%
P^H	-	5
Specific gravity	-	1.016
Viscosity at 50°c	-	11.5
Refractive index	-	1.44
Weight per ml	-	1.02 (gm/ml)
Iodine value	-	120.65 mg/ml
Saponification value	-	282.04
Total Iron content	-	0.512 mg/ml

Toxicity study of the drug:

IAEC NO: SU/ CLTAR/ IAEC/ VII/ 042/ 2016

ACUTE TOXICITY:

Acute and sub acute toxicity studies were conducted on experimental rats at Sathyabama University, Chennai, Tamilnadu.

Acute toxicity study of the drug *Chitramutti Nei* was carried out as the OECD guideline-423 (Organisation to Econamic Co-operation and Development).

The acute toxicity study of my trial drug was studied and the drug was proved safer for long term administration, as it did not exhibit any significant toxicity at 2000 mg / kg body weight.

SUB ACUTE TOXICITY:

Sub acute toxicity study as per the guideline of – 407. Under the dosage of trial drug 200mg / kg (Low dose), 400mg / kg (High dose) it did not exhibit any significant.

HISTO PATHOLOGY:

At the end of toxicity studies the animal were sacrified and they were subjected to hematological parameters (TC, DC & Hb) chemical parameters (LFT, RFT) and histopathology of vital organs like Liver, Kidney, Spleen, Lungs were carried out. The studied did not exhibit the evidence of remarkable pathological lesions in the tissues.

Pharmacological activity:

The pharmacological studies of trial medicine *Chitramutti Nei* showed significant Haematinic action Swiss albino rats.

Haematinic action of *Chitramutti Nei* was carried out by producing the by administrating a single intraperioneal injection of phenylhydrazine at a dose of 20 mg/kg b.w. Drop out period of four days was awaited until the sufficient drop in Hb level was noticed in animals. Rats were considered as anaemic model if haemoglobin concentration was less than 14g/dl. Then the trial drug was administered show a potent haematinic action during the studies.

Anti helminthic activity was conducted in Indian adult earthworms (Pheretimaposthuma) were collected from moist soil and washed with normal saline. Low dose and high dose treated group of which the worms were exposed to 10ml of the test formulation weight equivalent to 10gms and worms were exposed to

Albendazole 100mg/ml, 200mg/ml. The mean paralysis time and mean death time for each dose was calculated. The result obtained from the present clearly indicates that the test drug CN has anti-helminthic property

The result of preclinical screening, the result of chemical analysis, Toxicological studies, Pharmacological studies were shown in anexures.

Sex Distribution:

Among the 40 cases for this present study, 24 (60%) children were female and 16 (40%) children were male. According to modern theory there is no apparent gender prediction.

Age Distribution:

Among the 40 cases, maximum numbers of patients 30% were in the age group of 3to 5 years, 20% were in the age group of 5 to 7 years, 35% were in the age group of 7 to 10 years and 15% were in the age group of 10 to 12 years.

Socio Economic status:

Among the 40 cases, maximum numbers of patients 65% were in poor status, 30% were in middle class and 5% were in rich class. The highest incidence was observed in poor class children due to low nutritional diet, so the poor children are more prone to the disease.

Aetiological factor:

Among 40 cases, 90% cases were due to worm infestation, 37.5% cases were due to nutrional deficiency because of poor intake of food respectively.

Dietary Habits :

Among 40 cases was reported, 90% belonged to mixed diet and 10% belonged to vegetarian diet habit respectively.

According to Paruvakalam:

Regarding *Paruvakaalam* among 40 cases, 2.5% cases were reported in Kaar kaalam, 5% cases were reported in *Koothir kaalam* and *Elavenil Kaalam*, 52.5% cases

were reported in *Munpani kaalam*, 35% cases were reported in *Pinpani kaalam* and no cases were reported in *Muduvenil kaalam* respectively

Thinai:

Among the 40 cases reported were from surroundings of Chennai which belongs to *Neithal nilam.*It cause increase in pitham

Uyir Thathukkal:

Disturbance of *Vatham* :

In 40 cases, among 10 types of *Vaatham, Praanan* was affected in a 100% of cases because of dyspnoea on exertion, *Abanan* was affected in a 65% of cases due to constipation, *Viyaanan* was affected in a 100% of cases because of pallor of skin, *Samaanan and Kirukaran* were affected in a 100% of cases due to loss of appetite, *Devathathan* was affected in a 100% of cases due to tiredness respectively.

Disturbance of *Pitham*

Among 5 types *of Pitham*, except *Aalosagam* all types of pitham were affected. *Sathagam* was affected due to inability to do work, Ranjagam was affected which causes discolouration of blood, *Anal pitham* which causes loss of appetite, *Prasagam* was affected because of pallor of skin respectively.

Disturbance of *Kabam*

Among 40 cases, *Aavalamgam* was affected in 40 cases(100%) due to dyspnea and *Kilathagam* was affected in 40 cases (100%) due to loss of appetite respectively.

UdalKattukal:

In this, *Saaram* and *Senneer* were affected in 100% of the cases. *Saaram* was affected because of anorexia, *Senneer* was affected because of pallor of skin.

Ennvagai Thervugal

Among the Ennvagai thervukal, *Naa, Niram and Vizhi* were affected in all cases (100%). In 36 cases (90%) *Malam*, and in *Naadi* 20 cases (50%) *Pithavaatham*, in 9 cases (22.5%) *vathakabam* and in 12 cases (27.5%) *Kabapitham* were affected.

Nei kuri :

Among 40 cases, *Pitha neer* was observed in 55% cases, *vatha neer* was observed in 20% cases, *Kaba neer* was observed in 25% cases.

Clinical presentation:

Out of 40 patients, before treatment all the 40 patients had 100% of pallor of conjunctivae, tongue, nail beds, Anorexia, fatigue, 65% of cases had constipation, 50% of cases had Lack of interest and concentration, 100% of cases had dyspnoea on excertion, 43% of cases had weight loss. After treatment most of the patients were relieved from the symptoms of anorexia and constipation. Pallor of conjunctivae, tongue, nail buds was present in 25%, fatigue in 10%, lack of interest and dyspnoea on excertion in 15%, weight loss in 5% were observed in this study.

Lab investigation:

Routine blood and urine examination were done before and after the treatment. In most of the cases, Total RBC count, PCV, MCV, MCH, MCHC were observed to be reduced. After treatment there is a tremendous increase in the haemoglobin level, Total RBC count, PCV,MCV,MCH, MCHC.

Haemoglobin range was Good (65%) in 24 cases, Moderate (25%) in 10 cases, Poor (15%) in 6 cases in prognosis.

Bio statistical study:

Since the p value is significant in all signs and symptoms . So there is significant reducing of signs & symptoms among the patients for the treatment of *Paandu Noi*. Hence it is concluded that the treatment was effective and significan**t.**

Result observed from haemoglobin level:

Since the P value is highly significant (<0.001), So the treatment was significantly improving the Hb level among the patients for the treatment of *Paandu Noi.*

Results

The outcome of this study showed encouraging results. Among the 40 patients good improvement observed in 65%, moderate improvement in 25% and mild improvement in 15% and no adverse events observed clinically during the course of treatment.

Treatment:

In this study all 40 cases were treated with *Chitramutti Nei*. The trial medicine having the properties of neutralizing pitham was given to the patients to set right the deranged pitham on the basis of Arusuvai and Pancha bootham.

So the selected trial drug is in the form of ghee, is found to be normalize the increased pitham. Intake of ghee in therapeutic doses increase appetite and gives relief from abdominal discomfort and constipation.

The Rationale behind the use of trial drug as a ghee:

The lipid soluble drugs are rapidly distributed throughout the intra and extracellular spaces. That is drug given in the form of Ghee which is a fat are rapidly absorbed from the gut because of their lipid solubility are known to readily diffuse into the CSF and the brain.

The main reason behind this is, it cross Blood Brain Barrier. This membrane separating the CNS tissue and the circulating blood is lipophilic in nature. Thus it selectively allows the passage of lipids and lipid soluble across it.

The trial medicine contain iron in the form of ferrous state that are easily absorbed. And also contain Vitamin C it enhances the absorption of iron. The efficacy was established throughout the treatment. During the treatment the study subject were strictly advised to have Iron rich diet.

SUMMARY

To study the efficacy of Siddha trail drug *Chitramutti Nei* as internal medicine for the treatment of *Paandu Noi* in children.This disease mostly resembles Iron deficiency anaemia in modern system. Literature evidences of both Siddha and Modern system were collected and also the ingredients of the trial drug was reviewed as well. For the clinical study, 40 patients were selected based on protocol. This study is conducted after the drug being screened by the Screening committee and approved by the Institutional Ethical Committee (IEC) of Govt siddha medical college Chennai.

Selected patients with *Paandu Noi* diagnosed clinically treated in outpatient department of Govt siddha medical college attached with Arignar Anna Hospital of Indian Medicine, Chennai-106. They were undergone laboratory investigation treated with trial drug, observed for clinical improvement and any adverse reaction.

Qualitative analysis of the *Chitramutti Nei* presence of iron, calcium, starch, chloride and Reducing sugar. Phytochemical analysis of the trial drug shows that presence of Glycosides, carbohydrates, coumarins, phenol.

Physico chemical analysis of the trail drug shows the PH 5, Total ash value 2.11%, Moisture: 8.66% shows the safe and effectiveness of the trial drug . In elemental analysis shows that one milliliter of *Chitramutti Nei* contain 0.512(mg/ml) of iron.

Toxicological studies shows that, it has no significant toxic effect. From the preclinical pharmacological study shows that the drug has got a significant haematinic activity and Antihelminthic activity.

Bio – statistically analysis of the clinical trial reveals significant p values < 0.05 and < 0.01 and concluded that the treatment is effective and significant.

Among the 40 patient's good improvement was observed in 24 cases (65%), moderate improvement in 10 cases (25%) and mild improvement in 6 cases (15%).

CONCLUSION

Paandu noi is mainly caused by the derangement of *Pitham* followed by *vatham* and *kabam*. The deranged *kuttram* is settled down by the *kaippu suvai* in the trial drug there by medicine act effective in cure the disease.

In physico chemical Analysis iron was found to be present as effective ingredients in treating anaemia.

The *Chitramutti Nei* reveal no toxicity in the pre clinical studies and hence proven to be safe for human administration.

From the pre- clinical pharmacological study it is evident that the trial medicine has significant Haematinic action and Antihelminthic action.

Also *Chitramutti Nei* has been proved clinically. Since as it raises the haemoglobin level in a marked level to the patients given regularly for not less than 30 days along with supplementary diets. Both symptomatic and qualitative improvement were absorbed. For prognosis, routine haematological investigation was taken. During the treatment no adverse events were observed.

Statistically it has been proved that it shows significant raise in the haemoglobin level.

Hence I concluded that the trial drug *Chitramutti Nei* will be a better drug that can be used in the treatment *of Paandu Noi*.

ANNEXURE -II

BIO-CHEMICAL ANALYSIS

PREPARATION OF EXTRACT:

2 gm of the *Chitramutti Nei* is taken in a 100 ml beaker and 20 ml of distilled water is added. The solution is boiled for 10 minutes, cooled and then filtered. The filtrate is called extract. This fluid is taken for the Bio- Chemical analysis

QUALITATIVE ANALYSIS

S.NO	EXPERIMENT	OBSERVATION	INFERENCE
I.	**TEST FOR ACID RADICALS**		
1.	**Test for Chloride** 2 ml of extract is added with dilute nitric acid till the effervescence ceases. Then 2 ml of silver nitrate solution is added	Presence of white precipitate	Present
2.	**Test for Phosphate:** 2 ml of the extract is treated with 2ml of Ammonium molybdate solution and 2 ml of concentrated nitric acid	Absence of yellow precipitate	Absent
3.	**Test for Carbonate:** 2 ml of the extract is treated with 2 ml of magnesium sulphate solution	Absence of white precipitate	Absent
4.	**Test for Sulphide:** 1 gm of the substance is treated with 2 ml of concentrated Hydrochloric acid	Absence of Rotten egg smelling	Absent
5.	**Test for Sulphate:** 2ml of the above prepared extract is taken in a test tube to this added 2ml of 4% ammonium oxalate solution	Absence of white precipitate.	Absent
6.	**Test for Nitrate** 1 gm of the substance is heated with copper turnings and concentrated sulphuric acid and viewed the test tube vertically down	Absence of reddish brown gas	Absent
7.	**Test for Nitrite** 3 drops of the extract is placed on a filter paper. On that, 2 drop of Acetic acid and 2 drops of Benzidine solution is placed	Absence of yellowish red colour	Absent
8.	**Test for Borate** 2 pinches of the substance is made into paste by using Sulphuric acid and Alcohol (95%) and introduced into the blue flame	Absence of Green tinged flame	Absent

II	TEST FOR BASIC RADICALS		
9.	**Test for copper** One pinch of the substance is made into paste with concentrated Hydrochloric acid in a watch glass and introduced into the Non luminous part of the flame	Absence of Bluish green coloured flame	Absent
10.	**Test for iron** To the 2 ml of extract, 2 ml of Ammonium thiocyanate solution is added.	Presence of blood red colour	Present
11.	**Test for zinc** To the 2 ml of extract Sodium hydroxide solution is added in drops to excess	Absence of white precipitate	Absent
12.	**Test for calcium** 2 ml of the extract is added with 2 ml of 4 % Ammonium oxalate solution.	Presence of white precipitate	Present
13.	**Test for magnesium** 2ml of extract sodium hydroxide solution is added in drops to excess	Absence of white precipitate	Absent
14.	**Test for potassium** A pinch of substance is treated with 2 ml of sodium nitrite solution and then treated with 2 ml of Cobalt nitrate in 30% glacial Acetic acid	Absence of yellow precipitate	Absent
15.	**Test for sodium** 2 pinches of the substance is made into paste by using Hydrochloric acid and introduced into the blue flame	Absence of yellow colour flame	Absent
16.	**Test for starch** 2 ml of extract is treated with weak iodine solution	Blue colour is obtained	Present
17.	**Test for reducing sugar** 5 ml of Benedict's qualitative solution is taken in a test tube and allowed to boil for 2 minutes and added 10 drops of the extract and again boiled for 2 minutes. The colour changes are noted	Green colour is obtained	Present
18.	**Test for tannic acid** The extract is treated with ferric chloride solution	Absence of Blue black precipitate	Absent
19.	**Test of the alkaloids** 2 ml of the extract is treated with 2 ml of Picric acid	Yellow colour is not developed	Absent

RESULTS:

The trial drug Chitramutti Nei contains

Acid radical:

Chloride

Basic radicals:

Iron, calcium, starch and Reducing sugar.

ANNEXURE - III

PHYSICOCHEMICAL EVALUATION

Project ID : NRS/AS/0018/01/2017

Institute : Govt Siddha Medical College, Chennai

Sample Name :Chitramutti Nei

Sample ID : CN

Percentage Loss on Drying:

10gm of test drug was accurately weighed in evaporating dish .The sample was dried at 105^{o}C for 5 hours and then weighed.

Percentage loss in drying = Loss of weight of sample/ Wt of the sample X 100

Determination of Total Ash:

3 g of test drug was accurately weighed in silica dish and incinerated at the furnace a temperature 400 ºC until it turns white in color which indicates absence of carbon. Percentage of total ash will be calculated with reference to the weight of air-dried drug.

Total Ash = Weight of Ash/Wt of the Crude drug taken X 100

Determination of pH:

Sample being oily in nature the direct litmus evaluation method was adopted to check the pH of the sample.

Determination of specific gravity:

Fill the dry sp. gravity bottle with prepared samples in such a manner to prevent entrapment of air bubbles after removing the cap of side arm. Insert the stopper, immerse in water bath at 50^{O}C and hold for 30 min. Carefully wipe off any oil that has come out of the capillary opening. Remove the bottle from the bath, clean

and dry it thoroughly. Remove the cap of the side and quickly weigh. Calculate the weight difference between the sample and reference standard.

Determination of Iodine value :

About 20 gm of oil was transferred into Iodine flask. To which 10 ml of chloroform was added and warmed slightly and cooled for 10 minutes. Followed by this about 25 ml of Wiji's solution was added in the same flask and shaken well. The flask was allowed to stand for 30 mins and refrigerated for anhour.T About 10 ml of KI solution was added to this and titrated against 0.1 N Sodium thiosulphate solutions until the appearance of yellow colour. 1 ml of starch indicator was added and again titrated against the sodium thiosulphate solution from the burette. Disappearance of blue colour indicates end point. Repeat the above procedure without taking sample and note the corresponding reading for blank titration.

Determination of saponification value :

About 2 gm of test sample was transferred into the round bottomed flask. To this about 20 ml of 0.5 N alcoholic KOH solutions was added to the round bottomed flask. Repeatthe same procedure with out taking the sample for blank titration . Reflux both sample and blank round bottomed flasks for 1 hour. After reflux, allow both the round bottomed flasks to cool. Titrate the samples using 0.5 N HCl with phenolphthalein indicator. The disappearance of pink indicates the end point.

FINAL TEST REPORT:

Parameter	**Observation**
Color	Dark Yellowish
Smell	Pleasant
Touch	Greasy
Appearance	Clear After Melting

S.No	Parameter	Mean (n=3) SD
1.	***Loss on Drying at 105 °C (%)***	8.66 ± 1.22
2.	***Total Ash (%)***	2.11 ± 0.50
3.	***pH***	5

S.No	Specific Test	Chitramutti Nei
1.	Specific Gravity	1.016
2.	Viscosity at 50^{o}C (Pa s)	11.55
3.	Refractive index	1.44
4.	Weight per ml (gm/ml)	1.02
5.	Iodoine value (mg I2/g)	120.65
6.	Saponification Value (mg of KOH to saponify 1gm of fat)	282.04
7.	Total Iron content (mg/ml)	0.512

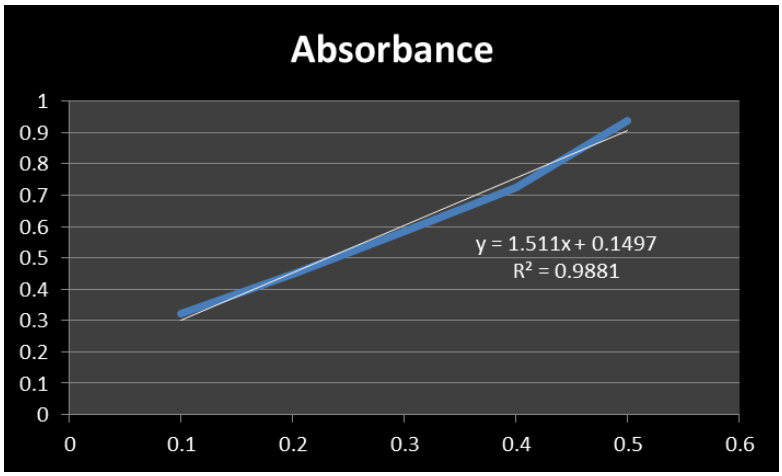
ESTIMATION OF IRON:

Preparation of standard solution:

0.2g of ferric ammonium sulphate was dissolved in distilled water containing 10ml of concentrated hydrochloric acid and the volume was made up to 250ml with distilled water 3. From this stock solution 1, 2, 3, 4 & 5ml was pipette out into 5 different 50ml volumetric flask and 5ml of 10% aq. hydroxyl ammonium chloride solution was added and the pH was adjusted between 3 to 5 using 2M sodium acetate buffer solution and 4ml of 1, 10-phenanthrolin was added and finally the volume was made up to 50ml with distilled water. After 15-20 min. the absorbance was noted at 515nm. The standard curve of concentration Vs absorbance was plotted.

Preparation of Test Solution:

0.21g of test sample was taken with 50ml of 6N hydrochloric acid and boiled for 2-3 min. Then it was filtered and the volume was made up to 250ml with distilled water. From this 5ml of solution was pipette out into 50ml volumetric flask and the same procedure was followed as in the preparation of standard solution. After 15-20 min. the absorbance was noted at 515nm. From the absorbance the corresponding concentration was determined by extrapolation of calibration curve.



Concentration mg/ml	Absorbance
0.1	0.321
0.2	0.448
0.3	0.583
0.4	0.725
0.5	0.938
Test Sample	0.924

Unknown concentration 0.512 mg/ml.

Result :

Total iron content -0.512mg/ml.

PHYTOCHEMICAL ANALYSIS

Sample Preparation

Chitramutti Nei (CN) was extracted with hexane and the extract was subjected to the following analysis

1) Test for alkaloids:

Mayer's Test: To the extract, 2ml of mayer's reagent was added, a dull white precipitate revealed the presence of alkaloids.

2) Test for coumarins:

To 1 ml of extract, 1 ml of 10% sodium hydroxide was added. The presence of coumarins is indicated by the formation of yellow color.

3) Test for saponins:

To 1 ml of the extract, 5 ml of water was added and the tube was shaken vigorously. Copious lather formation indicates the presence of Saponins.

4) Test for tannins:

To the extract, ferric chloride was added, formation of a dark blue or greenish black color showed the presence of tannins.

5) Test for glycosides- Borntrager's Test

Test drug is hydrolysed with concentrated hydrochloric acid for 2 hours on a water bath, filtered and the hydrolysate is subjected to the following tests. To 2 ml of filtered hydrolysate, 3 ml of choloroform is added and shaken, choloroform layer is separated and 10% ammomia solution is added to it. Pink colour indicates presence of glycosides.

6) Test for flavonoids:

To 0.1ml of the test sample about 5 ml of dilute ammonia solution were been added followed by addition of few drops of conc. Sulfuric acid. Appearance of yellow color indicates the presence of Flavonoids.

7) Test for phenols:

Lead acetate test: The extract was taken; 3 ml of 10% lead acetate solution was added. A bulky white precipitate indicated the presence of phenolic compounds.

8) Test for cardial glycosides:

Keller-Killani Test: Plant extract treated with 2 ml glacial acetic acid containing a drop of FeCl3 .A brown colour ring indicates the presence of positive test.

9) Test for steroids:

To the test solution 2ml of chloroform was added with few drops of conc. Sulphuric acid (3ml), and shaken well. The upper layer in the test tube was turns into red and sulphuric acid layer showed yellow with green fluorescence. It showed the presence of steroids.

10) Test for Quinones:

The extracts were treated separately with Alc. KOH solution. Appearance of colors ranging from red to blue indicates the presence of Quinones.

11) Test for Cyanins

A. Aanthocyanin:

To 2 ml of the leaf extract, 1 ml of 2N sodium hydroxide was added and heated for 5 min at 100□C. Formation of bluish green colour indicates the presence of anthocyanin.

B. Betacyanin:

To 2 ml of the leaf extract, 1 ml of 2N sodium hydroxide was added and heated for 5 min at 100□C. Formation of yellow colour indicates the presence of betacyanin.

12) **Test for Carbohydrates - Benedict's test**

To 0.5 ml of test drug about 0.5 ml of Benedic's reagent is added. The mixture is heated on a boiling water bath for 2 minutes. A characteristic coloured precipitate indicates the presence of sugar.

13) Test for terpenoids:

Salkowski test: 5ml of extract was mixed in 2ml of chloroform, and concentrated sulphuric acid was carefully added to form a layer. A reddish brown colouration of the interface indicates the presence of terpenoids.

RESULT ANALYSIS

PHYTOCOMPONENTS	CN
ALKALOIDS	-
FLAVONOIDS	-
GLYCOSIDES	+
STEROIDS	-
CARBOHYDRATES	+
TRITEREPNOIDS	-
COUMARINS	+
PHENOLS	+
CARDIAC GLYCOSIDES	-
TANNINS	-
SAPONINS	-
PROTEINS	-
ANTHOCYANIN	-
BETACYANIN	-
QUINONES	-

\+ Indicates positive

\- Indicates Negative

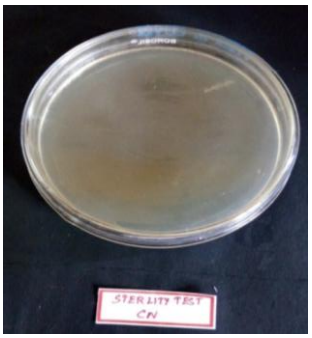
STERILITY TEST BY POUR PLATE METHOD

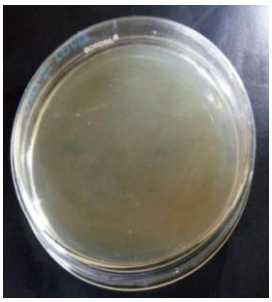
Objective:

The pour plate techniques were adopted to determine the sterility of the product. Contaminated / un sterile sample (formulation) when come in contact with the nutrition rich medium it promotes the growth of the organism and after stipulated period of incubation the growth of the organism was identified by characteristic pattern of colonies. The colonies are referred to as Colony Forming Units (CFUs).

Methodology:

About 1ml of the test sample was inoculated in sterile petri dish to which about 15 mL of molten agar 45^{o}C were added. Agar and sample were mixed thoroughly by tilting and swirling the dish. Agar was allowed to completely gel without disturbing it. (about 10 minutes). Plates were then inverted and incubated at 37^{o} C for 24-48 hours. Grown colonies of organism was then counted and calculated for CFU.





Observation

No growth was observed after incubation period. Reveals the absence of specific pathogen

Result

No growth / colonies were observed in any of the plates inoculates with the test sample.

Test	Specification	Result	Method
E-coli	Absent	Absent	As per AYUSH specification
Salmonella	Absent	Absent	
Staphylococcus Aureus	Absent	Absent	
Pseudomonas Aeruginosa	Absent	Absent	

ANNEXURE-IV

PROJECT REPORT ON
TOXICITY PROFILING OF *CHITRAMUTTI NEI*

Name	Dr.G.G.KALAISELVI
IAEC	SU/CLATR/IAEC/VII/043/2016
Name of the Formulation	Chitramutti Nei
Abbreviation	CN

ACUTE TOXICITY STUDY

Acute toxicity study of the study drug *Chitramutti Nei* was carried out as per OECD guideline (Organization for Economic Co-operation and Development) Guideline-423.

Animal

Healthy adult Wistar albino rat weighing between 170-200 g were used for the study. The animals were housed in poly propylene cages and were kept in well ventilated with 100% fresh air by air handling unit (AHU). A 12 light / dark cycle were maintained .Room temperature was maintained between 22 $\pm$ 2^0 Cand relative humidity 50–65%. They were provided with food (Sai feeds, Bangalore, India) and water *ad libitum*. All the animals were acclimatized to the laboratory for 7 days prior to the start of the study.

The experimental protocol was approved by The Institutional Animal Ethics Committee of Sathyabama University, Chennai, Tamil Nadu, India.

Acute toxicity Study

Acute toxicity study will be carried out in accordance with OECD guideline 423 [1]. The animals were fasted overnight with free access to water. The study was conducted with single oral dose administration of *Chitramutti Nei*.

IAEC	SU/CLATR/IAEC/VII/042/2016

Animal Grouping

One group consist of 6 female rats were used for this study. The dose utilized for evaluation of acute toxicity study is about 2000 mg/kg higher than that of the therapeutic dose.

Dose Equivalent = 1ml is equivalent to 1.02085 gm

Animal Grouping

GROUP I : Animals received Test drug 2000 mg/kg (p.o)

The animals were fasted overnight (12- 16 hrs) with free access to water. The study was conducted with single oral administration of study drug *Chitramutti Nei* 2000mg/kg equivalent to 0.4ml (p.o). The animals were observed continuously for first 72 h and then 14 days for emerging signs of behavioral changes, body weight changes and for mortality.

Occurrence of toxicity in animals were observed continuously for the first 4 to 24 h and observed periodically for the next 14 days. Observation includes the change in skin, fur, eyes and mucus membrane. Appearance of C.N.S,C.V.S and A.N.S related toxicity such as tremors, convulsions, sedation, steric behavior, respiratory distress, cardiovascular collapse, response to sensory stimuli, salivation, diarrhea, lethargy, sleep, coma and mortality were observed with special attention.

Body weight was recorded periodically. At the end of the experiment all animals were subjected for gross necropsy and observed for pathological changes.

SUB-ACUTE TOXICITY STUDY

Sub-acute toxicity study was carried out as per OECD guidelines Guideline-407 [2].

Animals

Healthy adult Wistar albino rat weighing between 170-200 g were used for the study. The animals were housed in poly propylene cages and were kept in well ventilated with 100% fresh air by air handling unit (AHU). A 12 light / dark cycle were maintained .Room temperature was maintained between 22 $\pm$ 2^{o} Cand relative humidity 50–65%. They were provided with food (Sai feeds, Bangalore, India) and water *ad libitum*. All the animals were acclimatized to the laboratory for 7 days prior to the start of the study.

The experimental protocol was approved by The Institutional Animal Ethics Committee of Sathyabama University, Chennai, Tamil Nadu, India.

Animal Grouping

Animals were divided into three groups of 06 animals each consist of 3 male and 3 female rats.

GROUP I : Animals received saline 5 ml/kg b.w (p.o)

GROUP II : Animals received low dose of test drug 200 mg/kg (p.o)

GROUP III : Animals received high dose of test drug 400 mg/kg (p.o)

The animals were randomly divided into control group and drug treated groups for two different doses viz. low dose (200 mg/kg b.w) equivalent to 0.2 ml and high dose (400 mg/kg b.w) equivalent to 0.4 ml,p.o per rat.

The animals were administrated with the study drug once daily for 28 days. The animals in group I (control group) received normal saline 5 ml/kg b.w. The animals in group II received low dose of *Chitramutti Nei* 200 mg/kg b.w (p.o) and group III received high dose of *Chitramutti Nei* 400 mg/kg b.w (p.o).

The rats were weighed periodically and observed for signs of toxicity pertain to C.N.S, C.V.S, A.N.S including behavioral changes, food - water intake and morphological changes. At the end of 28^{th} day, the animals were fasted for overnight with free access to water. On 29^{th} day the animals were sacrificed with excess anesthesia. Blood samples were collected from aorta and stored in EDTA (ethylenediamine –tetra actate) for Hematological analysis and for serum generation for biochemical analysis.

The vital organs including heart, brain, lungs, spleen, kidneys, liver, stomach, testes, and ovary were harvested and carefully examined for gross lesions. The organs were preserved in 10% formalin for histopathological assessment and interpretation.

Hematological analysis

Blood samples were analyzed using established procedures and automated Bayer Hematology analyzer. Parameters evaluated include Packed Cell Volume (PCV), Red Blood Cells (RBC) count, White blood cell count (WBC), Platelet Count, Hemoglobin (Hb), Mean cell Haemoglobin Concentration (MCHC), Mean Red Cell Volume (MCV), Mean Cell Hemoglobin (MCH), Mean platelet volume (MPV), Neutrophils, Eosinophil's, Basophils, Lymphocytes and Monocytes.

Biochemical analysis [3]

Serum samples were analyzed for High Density Lipoprotein (HDL), Low density Lipoprotein (LDL) , Very low density Lipoprotein (VLDL) , Triglycerides (TGL), Total Cholesterol , Blood urea nitrogen (BUN), Creatinine, Albumin, Total Protein, Glucose, Uric acid, Aspartate Transaminase (AST), Alanine amino Transaminase (ALT) and Alkaline Phosphatase (ALP) using Mind ray auto analyzer model BS 120.

Histopathological evaluation [4]

Organs included of heart, brain, lungs, spleen, kidneys, liver, stomach, testes and ovary. Histological slides of organs were made and observed under the

microscope. The pathological observations of cross section of these organs were performed on gross and microscopic bases. Histological examinations were performed on the preserved tissues with particular emphasis on those which showed gross pathological changes.

Statistical analysis

The statistical analysis was carried by one way ANOVA (GRAPH PAD PRISM 5 computer program). Results were expressed as mean ± standard error .A statistical comparison was carried out using the Dunnet's test for the control and treatment group.

Fecal Pellet Analysis

Methodology

Rats of control and treatment group were allowed to explore to open field on clean and sterile Stainless steel tray. The collected pellets were analyzed for consistency, color, Shape, Presence of blood cells etc

Acute Toxicity Study

Analysis	Group I
Consistency	Soft-Fatty
Shape	Oblong
Colour	Dark Green
Mucous Shedding	Absence
Blood Cells	Absent
Signs of Infection	None Observed

Sub-Acute Toxicity Study

Analysis	Group I	Group II	Group III
Consisteny	Soft	Soft	Soft - steatorrhea
Shape	Oblong	Round ended	Round ended
Colour	Greenish	Brown	Brown
Mucous Shedding	Absence	Absence	Absence
Blood Cells	Absent	Absent	Absent
Signs of Infection	None Observed	None Observed	None Observed

Muscle Grip Strength Analysis

The grip strength test is a simple non-invasive method designed to evaluate rat muscle force in vivo. Rats of control and drug treated group was allowed to hold the pull bar with both the hind limbs firmly then the animal was gently pulled back with the tail until the animal lost the grip toward the bar. The procedure was repeated to get the

average value. Muscle grip ness of the drug treated group was compared to that of the control rat to ensure the change in coordination.

Metabolic Cage for Urine Collection

Rat of control and treatment group was placed individually in metabolic cage with free access to feed and water. Urine dropping from the animal was collected using specialized wire mesh system fixed at the base of the cage having provision to trap the fecal pellet mixed with urine sample. The collected urine sample was subjected to analysis with respect to colour, pH, glucose, ketone bodies, pus and blood cells.

RESULTS

Assessment of clinical signs in rats treated with *Chitramutti Nei*on Acute toxicity study

Acute	
Parameter	**Group I**
Clinical Signs Parameters for the duration of 14 days	Test Drug 2000mg/kg
Number of animals observed	6 Female
Lacrimation	Absence
Salivation	Absence
Animal appearance	Normal
Tonic Movement	Absence
Clonic Movement	Absence
Laxative action	Mild
Touch Response	Normal
Response to Sound	Normal Response
Response to Light	Normal Response
Mobility	Normal Response
Respiratory Distress	Nil
Skin Color	Normal
Stereotype behavior	Absence
Piloerection	Absence
Limb Paralysis	Absence
Posture	Normal
Open field behavior	Normal
Giat Balancing	Normal
Freezing Behaviour	Absent
Sings of Stress and Anxiety	None Observed
Muscular coordination	Normal

Muscle grip	Normal
Sedation	Absence
Social Behavior	Normal
Urine Analysis	No Abnormality
Urine Colour	Yellowish
Urine Ph	6
Urine -Glucose	Absence
Urine -Ketones	Absence
Urine- Bilirubin	Absence
Urine-Blood Cells	Negative
Urine - Pus cells	Negative
Mortality	Nil

Quantitative data on the body weight of rats treated with *Chitramutti Nei* in Acute toxicity study

Group I	**Before Treatment Weight in Gms**	**After Treatment Weight in Gms**
Mean	177.7	186.2
Std. Deviation	6.89	9.847
Std. Error	2.813	4.02

Values are mean ± S.D (n = 6 per group). Statistical significance carried out using one way ANOVA followed by Dunnett's test.

Assessment of clinical signs in rats treated with *Chitramutti Nei* on Sub-Acute toxicity study

SUB ACUTE			
Parameter	**Group I**	**Group II**	**Group III**
Clinical Signs Parameters for the duration of 28 days	Control	Test Drug 200mg/kg	Test Drug 400mg/kg
Number of animals observed	3 Males and 3Females	3 Males and 3Females	3 Males and 3Females
Lacrimation	Absence	Absence	Absence
Salivation	Absence	Absence	Absence
Animal appearance	Normal	Normal	Normal
Tonic Movement	Absence	Absence	Absence
Clonic Movement	Absence	Absence	Absence
Laxative action	Absence	Mild	Moderate
Touch Response	Normal	Normal	Normal
Response to Sound	Normal Response	Normal Response	Normal Response

Response to Light	Normal Response	Normal Response	Normal Response
Mobility	Normal Response	Normal Response	Normal Response
Respiratory Distress	Nil	Nil	Nil
Skin Color	Normal	Normal	Normal
Stereotype behavior	Absence	Absence	Absence
Piloerection	Absence	Absence	Absence
Limb Paralysis	Absence	Absence	Absence
Posture	Normal	Normal	Normal
Open field behavior	Normal	Normal	Normal
Giat Balancing	Normal	Normal	Normal
Freezing Behaviour	Absent	Absent	Absent
Sings of Stress and Anxiety	None Observed	None Observed	None Observed
Muscular coordination	Normal	Normal	Normal
Muscle grip	Normal	Normal	Normal
Sedation	Absence	Absence	Absence
Social Behavior	Normal	Normal	Normal
Urine Analysis	No Abnormality	No Abnormality	No Abnormality
Urine Colour	Yellowish	Yellowish	Yellowish
Urine pH	6	7	7
Urine - Glucose	Absence	Absence	Absence
Urine - Ketones	Absence	Absence	Absence
Urine- Bilirubin	Absence	Absence	Absence
Urine-Blood Cells	Negative	Negative	Negative
Urine - Pus cells	Negative	Negative	Negative
Mortality	Nil	Nil	Nil

Effect of *Chitramutti Nei*on Body weight of Rats in Sub-acute toxicity study

Group I	**Before Treatment Weight in Gms**	**After Treatment Weight in Gms**
Mean	184	195.5
Std. Deviation	5.177	5.958
Std. Error	2.113	2.432

Group II	Before Treatment Weight in Gms	After Treatment Weight in Gms
Mean	180.5	191.2
Std. Deviation	7.893	10.44
Std. Error	3.222	4.262
Group III	**Before Treatment**	**After Treatment Weight in Gms**
Mean	184.3	194.2
Std. Deviation	6.563	6.735
Std. Error	2.679	2.75

Values are mean ± S.D (n = 6 per group of which 3 males and 3 females). Control and treatment groups were compared statistically using one way ANOVA followed by Dunnett's test.

Quantitative data on the food and water intake of rats treated with *Chitramutti Nei* for 28 days in Sub-acute toxicity study

GROUP I	Food intake	Water intake
Mean	17.42	22.25
Std. Deviation	3.573	6.437
Std. Error	1.787	3.219
GROUP II	**Food intake**	**Water intake**
Mean	19.25	32.83
Std. Deviation	1.032	2.253
Std. Error	0.5159	1.126
GROUP III	**Food intake**	**Water intake**
Mean	16.75	31
Std. Deviation	1.813	2.126
Std. Error	0.9065	1.063

Values are mean ± S.D (n = 6 per group of which 3 males and 3 females). Control and treatment groups were compared statistically using one way ANOVA followed by Dunnett's test.

Effect of *Chitramutti Nei* on Haematology profile of rats in sub-acute toxicity study.

GROUP I	WBC count ($\times 10^3$ µl)	RBC ($\times 10^6$ µl)	PLT ($\times 10^3$ µl)	MCV (fl)	MCH (pg)	MCHC (g/dl)	HGB (g/dl)
Mean	9.933	6.6	679.8	58.83	19.22	32.75	13.27
Std. Deviation	1.483	1.103	174.3	6.218	2.232	1.299	1.089
Std. Error	0.6053	0.4502	71.15	2.538	0.9112	0.5303	0.4447
GROUP II	**WBC count ($\times 10^3$ µl)**	**RBC ($\times 10^6$ µl)**	**PLT ($\times 10^3$ µl)**	**MCV (fl)**	**MCH (pg)**	**MCHC (g/dl)**	**HGB (g/dl)**
Mean	8.85	6.517	1008	62.48	19.57	31.57	13.05
Std. Deviation	0.8939	0.9196	244.9	5.319	1.99	1.372	1.495
Std. Error	0.3649	0.3754	100	2.172	0.8123	0.5602	0.6103
GROUP III	**WBC count ($\times 10^3$ µl)**	**RBC ($\times 10^6$ µl)**	**PLT ($\times 10^3$ µl)**	**MCV (fl)**	**MCH (pg)**	**MCHC (g/dl)**	**HGB (g/dl)**
Mean	8.95	6.183	1015	62.25	18.07	32.77	13.9
Std. Deviation	2.651	1.026	224.8	4.567	1.802	1.581	1.556
Std. Error	1.082	0.4191	91.76	1.864	0.7356	0.6453	0.6351

Values are mean ± S.D (n = 6 per group of which 3 males and 3 females). Control and treatment groups were compared statistically using one way ANOVA followed by Dunnett's test.

Effect of *Chitramutti Nei* onHaematology profile of rats in sub-acute toxicity study.

GROUP I	Lymph (%)	Mon (%)	Neutrophils 10^3/mm3	Eosinophils (%)	Basophils (%)	MPV (fl)
Mean	80.92	3.6	2.5	1.667	0.1667	5.833
Std. Deviation	6.151	0.9033	0.6033	0.2251	0.4082	1.14
Std. Error	2.511	0.3688	0.2463	0.09189	0.1667	0.4652
GROUP II	**Lymph (%)**	**Mon (%)**	**Neutrophils 10^3/mm3**	**Eosinophils (%)**	**Basophils (%)**	**MPV (fl)**
Mean	76.93	3.45	2.15	1.55	0.1667	6.167
Std. Deviation	5.562	1.097	0.5891	0.3271	0.4082	1.5
Std. Error	2.271	0.4478	0.2405	0.1335	0.1667	0.6125

GROUP III	Lymph (%)	Mon (%)	Neutrophils 10^3/mm3	Eosinophils (%)	Basophils (%)	MPV (fl)
Mean	74.67	3.65	2.617	1.383	0.3333	5.967
Std. Deviation	5.923	1.071	0.736	0.2994	0.5164	1.289
Std. Error	2.418	0.4372	0.3005	0.1222	0.2108	0.5264

Values are mean ± S.D (n = 6 per group of which 3 males and 3 females). Control and treatment groups were compared statistically using one way ANOVA followed by Dunnett's test.

Effect of *Chitramutti Nei* on Serum Bio-chemistry profile of rats in sub-acute toxicity study

GROUP I	Blood sugar (mg/dl)	BUN (mg/dl)	Serum creatinine (mg/dl)	Serum total cholesterol (mg/dl)	Serum triglycerides level (mg/dl)	Serum HDL cholesterol (mg/dl)	Serum LDL cholesterol (mg/dl)	Serum VLDL cholesterol (mg/dl)
Mean	77	18.83	0.6833	117	74.33	69.17	31.33	16.45
Std. Deviation	6.066	2.317	0.1722	4.942	5.888	3.545	5.007	2.971
Std. Error	2.477	0.9458	0.07032	2.018	2.404	1.447	2.044	1.213
GROUP II	**Blood sugar (mg/dl)**	**BUN (mg/dl)**	**Serum creatinine (mg/dl)**	**Serum total cholesterol (mg/dl)**	**Serum triglycerides level (mg/dl)**	**Serum HDL cholesterol (mg/dl)**	**Serum LDL cholesterol (mg/dl)**	**Serum VLDL cholesterol (mg/dl)**
Mean	78.67	17.33	0.75	108.7	77.67	60.67	32.17	15.88
Std. Deviation	7.528	4.367	0.1871	7.913	7.339	5.502	9.786	2.003
Std. Error	3.073	1.783	0.07638	3.23	2.996	2.246	3.995	0.8179
GROUP III	**Blood sugar (mg/dl)**	**BUN (mg/dl)**	**Serum creatinine (mg/dl)**	**Serum total cholesterol (mg/dl)**	**Serum triglycerides level (mg/dl)**	**Serum HDL cholesterol (mg/dl)**	**Serum LDL cholesterol (mg/dl)**	**Serum VLDL cholesterol (mg/dl)**
Mean	86.83	16.17	0.8333	115.1	74.83	64.67	32.83	17.55
Std. Deviation	13.92	3.869	0.216	7.234	7.36	7.367	10.15	3.257
Std. Error	5.683	1.579	0.08819	2.953	3.005	3.007	4.143	1.33

Values are mean ± S.D (n = 6 per group of which 3 males and 3 females). Control and treatment groups were compared statistically using one way ANOVA followed by Dunnett's test.

Effect of *Chitramutti Nei* on Serum Bio-chemistry profile of rats in sub-acute toxicity study

GROUP I	**Serum total protein (g/dl)**	**Serum albumin (g/dl)**	**(AST) (IU/ml)**	**(ALT) (IU/L)**	**(ALP) (IU/L)**
Mean	6.35	3.6	102.3	36.5	112
Std. Deviation	0.9995	0.08944	13.87	7.714	15.47
Std. Error	0.408	0.03651	5.661	3.149	6.314
GROUP II	**Serum total protein (g/dl)**	**Serum albumin (g/dl)**	**(AST) (IU/ml)**	**(ALT) (IU/L)**	**(ALP) (IU/L)**
Mean	6.467	3.667	100.2	28	137.7
Std. Deviation	0.7062	0.4412	16.24	8.149	18.52
Std. Error	0.2883	0.1801	6.63	3.327	7.562
GROUP III	**Serum total protein (g/dl)**	**Serum albumin (g/dl)**	**(AST) (IU/ml)**	**(ALT) (IU/L)**	**(ALP) (IU/L)**
Mean	6.7	3.883	96.17	27.17	117.5
Std. Deviation	0.743	0.4708	13	8.704	23.56
Std. Error	0.3033	0.1922	5.307	3.554	9.619

Values are mean ± S.D (n = 6 per group of which 3 males and 3 females). Control and treatment groups were compared statistically using one way ANOVA followed by Dunnett's test.

Quantitative data on absolute organ weight of rats treated with *Chitramutti Nei*for 28 days in Sub-acute toxicity study.

Group I	**Heart (gms)**	**Liver (gms)**	**Kidneys (gms)**	**Spleen (gms)**	**Brain (gms)**	**Lung (gms)**	**Stomach (gms)**	**Testes (gms)**	**Uterus & ovary (gms)**
Mean	0.7683	5.948	1.617	0.5667	1.483	1.6	1.15	1.833	0.8667
Std. Deviation	0.05636	0.9834	0.2137	0.1633	0.1472	0.3162	0.501	0.4933	0.4041
Std. Error	0.02301	0.4015	0.08724	0.06667	0.06009	0.1291	0.2045	0.2848	0.2333
Group II	**Heart (gms)**	**Liver (gms)**	**Kidneys (gms)**	**Spleen (gms)**	**Brain (gms)**	**Lung (gms)**	**Stomach (gms)**	**Testes (gms)**	**Uterus & ovary (gms)**
Mean	0.5767	5.183	1.6	0.6167	1.45	1.467	0.7667	2.033	0.7667
Std. Deviation	0.155	0.9404	0.1414	0.1472	0.1871	0.3077	0.1211	0.3215	0.3786
Std. Error	0.06328	0.3839	0.05774	0.06009	0.07638	0.1256	0.04944	0.1856	0.2186
GROUP III	**HEART (gms)**	**LIVER (gms)**	**KIDNEYS (gms)**	**SPLEEN (gms)**	**BRAIN (gms)**	**LUNG (gms)**	**STOMACH (gms)**	**TESTES (gms)**	**& OVARY (gms)**
Mean	0.6583	5.718	1.567	0.6333	1.55	1.483	1	3.167	0.9333
Std. Deviation	0.2088	1.055	0.2338	0.216	0.1643	0.2401	0.3521	0.3215	0.4933
Std. Error	0.08526	0.4309	0.09545	0.08819	0.06708	0.09804	0.1438	0.1856	0.2848

Values are mean ± S.D (n = 6 per group of which 3 males and 3 females) for Heart, Liver, Kidney, Brain, Spleen, Lung, Stomach. Values are mean ± S.D (n = 3 per group per sex) for testes , ovary and uterus for Control and treatment groups were compared statistically using one way ANOVA followed by Dunnett's test.

ANNEXURE –V

PHARMACOLOGICAL STUDY
A.HAEMATINIC ACTIVITY

Name	Dr.G.G.KALAISELVI
IAEC	SU/CLATR/IAEC/VII/043/2016
Name of the Formulation	Chitramutti Nei
Abbreviation	CN

Aim:

To find out the Haematinic activity of *Chitramutti Nei in female Swisss albino rats*

Preparation of Stock Solution

The suspension of CN was prepared by mixing with water at a concentration of 200 mg/ml stock solution. The solution was administered orally by gastric intubation in rats.

Animals:

Female Swiss albino rats weighing about 230-250 gm were obtained from the animal house of Sathyabama University, Chennai. The animals were acclimated to standard laboratory condition (temperature – 24 to 28°C and humidity 60- 70%) and maintained on 12 hr light/ dark cycle. The animals were housed in polypropylene cages and fed with standard rodent pellet obtained and water *ad libitum.*

Evaluation of the Haematinic activity:

Anaemia was induced in rats by administrating a single intraperioneal injection of phenyl hydrazine at a dose of 20 mg/kg b.w. Drop out period of four days was awaited until the sufficient drop in Hb level was noticed in animals. Rats were considered as anaemic model if haemoglobin concentration was less than 14g/dl. From day 5 to day 19, the test drug was administered orally at two different doses (100mg/kg, 200mg/kg). On day 20 blood was collected by retro orbital puncture for haematological evaluation and the blood parameters were analysed.

Group I – treated as negative control (phenyl hydrazine induced anaemic rats) administered vehicle only.

Group II– Animal injected with phenyl hydrazine 20mg/kg + treated with test drug 100 mg/kg, p.o. (Low dose Group)

Group III– Animal injected with phenyl hydrazine 20mg/kg + treated with test drug 200 mg/kg, p.o. (High dose Group)

Group IV- Considered as positive control administered standard haematinic syrup.

HAEMATOLOGICAL INVESTIGATIONS:

The blood samples form negative control and drug treated rats were collected into heparinized tubes after 14 days treatment (on day 20) and parameters such as haemoglobin count, red blood cells (RBC), packed cell volume (PCV), Mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH) were analysed.

Haematological Parameters of Rats after Treatment with CN.

PHZ	**RBC ($\times 10^6$ µl)**	**PCV %**	**MCV (fl)**	**MCH (pg)**	**MCHC (g/dl)**	**HGB (g/dl)**
Mean	4.27	38.44	40.90	12.05	26.07	10.68
Std. Deviation	0.21	0.58	0.41	0.195	0.213	0.40
Std. Error	0.08	0.24	0.16	0.079	0.086	0.166
GROUP II CN(100mg)	**RBC ($\times 10^6$ µl)**	**PCV %**	**MCV (fl)**	**MCH (pg)**	**MCHC (g/dl)**	**HGB (g/dl)**
Mean	6.168	43.79	46.05	13.23	31.57	13.05
Std. Deviation	0.244	0.259	0.440	0.261	1.372	1.495
Std. Error	0.09	0.10	0.17	0.10	0.5602	0.6103
GROUP III CN(200mg)	**RBC ($\times 10^6$ µl)**	**PCV %**	**MCV (fl)**	**MCH (pg)**	**MCHC (g/dl)**	**HGB (g/dl)**
Mean	6.708	47.738	55.49	17.56	32.77	14.98
Std. Deviation	0.170	0.219	0.182	0.183	1.581	0.133
Std. Error	0.069	0.089	0.182	0.074	0.6453	0.135
STANDARD	**RBC ($\times 10^6$ µl)**	**PCV %**	**MCV (fl)**	**MCH (pg)**	**MCHC (g/dl)**	**HGB (g/dl)**
Mean	6.988	51.90	74.378	27.95	33.891	21.8
Std. Deviation	0.144	0.184	0.203	0.189	0.201	0.456
Std. Error	0.059	0.075	0.083	0.077	0.08	0.186

*Values are expressed as mean+SEM (Dunnet't' test) *p<0.05; **p<0.01 vs control* $n=6$.

Statistical Analysis:

The statistical analysis was carried by one way ANOVA (GRAPH PAD PRISM 5 computer program). Results are expressed as mean ± standard error. A statistical comparison was carried out using the Dunnets 't' multiple comparison test for comparing control and treatment group.P value less than 0.05 considered as statistically significant

B. ANTI-HELMINTHIC ACTIVITY OF THE STUDY DRUG CN

Project Id: NRS/AS/0018/01/2017

Total Sample: 01

Sample ID: CN

Institute: Govt Siddha Medical College, Chennai

Dose Equivalent of Test drug = 1ml is equivalent to 1.02085 gm

Earthworm

Indian adult earthworms (Pheretimaposthuma) were collected from moist soil and washed with normal saline were used for the anthelmintic study. The earthworms of 4-6 cm in length and 0.1-0.2 cm in width were used.

Procedure

The worms were acclimatized to the laboratory condition one week prior to the experimentation. The earthworms were divided into three groups of four earthworms in each group of two per petri dish. Albendazole at the concentration of 100mg/ml was served as standard.Clean and sterile petri plates were used for the study. Group I served as low dose treated group of which the worms were exposed to 10ml of the test formulation weight equivalent to 10gms and Group II served as high dose treated group of which the worms were exposed to 20ml of the test formulation weight equivalent to 20gms . Group III served as standard drug treated group of which the worms were exposed toAlbendazole 100mg/ml.

GROUPING

Group I – Worms exposed to CN 10ml

Group II – Worms exposed to CN 20ml

Group III – Worms exposed to Albendazole 100mg/ml

Observation

Earthworms of nearly equal size in length and width are taken for each concentration and placed in Petri dishes at room temperature. The time taken for complete paralysis and death are recorded. The mean paralysis time and mean death time for each dose was calculated .The time taken for worms to become motionless was noted as paralysis time and to ascertain death, each worm was frequently applied with external stimuli, which stimulates and induce movement in the earthworms.

Group	Concentration	Man/SD	Time taken for paralysis (min)	Time taken for death (min)
I	10gms	Mean	149	303.3
		Std. Deviation	15.34	6.898
		Std. Error	7.67	3.449
II	20gms	Mean	120.5	260.5
		Std. Deviation	8.544	20.16
		Std. Error	4.272	10.08
III	Albendazole 100mg/ml	Mean	50.5	88
		Std. Deviation	14.48	7.303
		Std. Error	7.24	3.651

RESULT ANALYSIS

The result obtained from the present clearly indicates that the test drug CN has anti-helminthic property. Maximum time take for the test drug CN to cause paralysis of worms is about149 ± 15.3 mins, similarly the time taken of CN at the of 20gm would be 120.5 ± 8.54 mins for standard drug albendazole it was50.5 ± 14.4mins at the concentration of 100mg/ml.

Maximum time take for the test drug CN to cause death of worms is about 303.3± 6.89mins, similarly the time taken of CN at the dose of 20gm would be 260.5 ± 20.16mins for standard drug albendazole it was 88± 7.30mins at the concentration of 100mg dose /ml.

CONCLUSION

From the result of the study it was concluded that the test drug CN possess convincing anthelmintic property.

Group I

Group II

GROUP III

ANNEXURE-VI

BIO-STATISTICS

Treatment for Paandu Noi:

The most popular non parametric statistical tool, namely, McNemar Test analysis has been employed to analyses the effectiveness with the help of a hypothesis.

S. No	Signs&Symptoms	Before Treatment	After Treatment
		n%	n%
1.	Pallor of conjunctivae, tongue, nail beds	40(100)	10(25)**
2.	Anorexia	40(100)	0(0)**
3.	Fatigue / Lassitude	40(100)	4(10)**
4.	Constipation	26(65)	3(8)**
5.	Lack of interest & concentration	16(40)	6(15)*
6.	Dyspnoea on exertion	15(38)	2(5)*
7.	Weight loss	17(43)	2(5)*

McNemat test, C.I: 95%, *P<0.05; **P<0.01

Software: spss17 version

Number of cases: 40

Inference:

Since the p value is significant in all signs and symptoms So there is significant reducing of signs & symptoms except dimness of vision among the patients for the treatment of *Paandu Noi*.Hence it is concluded that the treatment was effectiveand significant.

HAEMOGLOBIN LEVEL:

Software: spss17 version

Variables: Hb level (gm/dl)– before treatment, after treatment

Number of cases: 40

Test: Paired t test

Confidence Interval: 95%

Correlation coefficient (r): 0.500

Before and after treatment mean difference ± SEM: 1.98± 0.15.

P Value (2 tailed): $p<0.001$.

Inference:

Since the P value is highly significant (<0.001), So the treatment was significantly improving the Hb level among the patients for the treatment of *Paandu* Noi.

ANNEXURE -VII

GOVERNMENT SIDDHA MEDICAL COLLEGE

ARIGNAR ANNA GOVERNMENT HOSPITAL OF INDIAN MEDICINE

CHENNAI – 600 106

CLINICAL STUDY ON **"CHITRAMUTTI NEI"** IN THE TREATMENT OF **"PAANDU NOI'' (IRON DEFICIENCY ANAEMIA)** IN CHILDREN

FORM l - SCREENING AND SELECTION PROFORMA

1.OP NO : .....

2.NAME : …….....

3.AGE : …… 4.GENDER : …….....

5. F.OCCUPATION :……

6.F.INCOME: ……

7. ADDRESS : …….....

…….....

…….....

8. CONTACT NO: ……

INCLUSION CRITERIA:

- Age : 3-12 Yrs Yes/ No
- Hb 7-11 gm Yes/ No
- Patient having sign of pallor in conjunctivae, tongue, Nail bud Yes/ No
- Patient having symptoms of fatigue , Anorexia, dyspnoea on exertion Yes / No
- Loss of memory/ lack of concentration Yes/ No
- Patient suffering from worm infestation Yes/ No
- Patients who are willing to undergo laboratory investigation. Yes/No
- Patients who are willing to sign the informed consent stating that she will continuously stick to the treatment during 28days but can opt out of the trial of her own conscious discretion. Yes/No

EXCLUSION CRITERIA

(Clinical history)

- History of Metabolic disorder
- History of Haemolytic anaemia
- Patient with chronic disease
- Patient with any other serious illness

ADMITTED TO TRIAL:

YES **NO**

If yes, **OPD/IPD**

Date:

Station:

Signature of the Guide **Signature of the Investigator**

GOVERNMENT SIDDHA MEDICAL COLLEGE

ARIGNAR ANNA GOVERNMENT HOSPITAL OF INDIAN MEDICINE

CHENNAI – 600 106

CLINICAL STUDY ON "CHITRAMUTTI NEI" IN THE TREATMENT OF

"PANNDU NOI'' (IRON DEFICIENCY ANAEMA) IN CHILDREN

FORM II -HISTORY TAKING PROFORMA

1. SERIAL NO. OF THE CASE: ……..... 2.OP/IP NO: .....

3. NAME: …… 4. AGE: …….....

5. GENDER: …….....

5.F.OCCUPATION: ……

6.F. INCOME: …….....

7.COMPLAINTS& DURATION:

8. PERSONAL HISTORY:

9. HISTORY OF PREVIOUS ILLNESS:

10. BIRTH HISTORY:

11. DIETARY HABIT:

1.Vegetarian

2.Non-vegetarian

12. FAMILY HISTORY:

Whether this problem runs in family?

1. Yes 2.No

If yes, mention the relationship of affected person(s) _____

History of previous investigations if any _____

Date:

Station

Signature of the Guide **Signature of the Investigator**

GOVERNMENT SDIDHA MEDICAL COLLEGE

ARIGNAR ANNA GOVERNMENT HOSPITAL OF INDIAN MEDICINE

CHENNAI – 600 106

CLINICAL STUDY ON **"CHITRAMUTTI NEI"** IN THE TREATMENT OF

"PAANDU NOI'' (IRON DEFICIENCY ANAEMIA)IN CHILDREN

FORM III ASSESSMENT PROFORMA

1.SERIAL NO: …….....

2.OP / IP NO: .....

3. NAME: ……..... 4.AGE: ……....

5.GENDER: .....

GENERAL EXAMINATION:

Height (cms)	**: …….**
Weight (kg)	**: …….**
Temperature(°F)	**: …….**
Pulse rate(/min)	**: …….**
Heart rate(/min)	**: …….**
Respiratory rate(/min)	**: …….**
Blood pressure(mm/Hg)	**: …….**

	Present	**Absent**
Pallor		
Jaundice		
Cyanosis		
Lymphadenopathy		
Pedal edema		
Clubbing		
Jugular vein pulsation		

SYSTEMIC EXAMINATION

CardioVascular System : …….

Respiratory system : …….

Gastro-intestinal system : …….

Central Nervous System : …….

Urogenital system : …….

Endocrine System : …….

SIDDHA SYSTEM OF EXAMINATIONS:

1. THEGI: [BODY CONSTITUTION]

1. Vatha udal
2. Pitha udal
3. Kaba udal
4. Thontha udal

2. NILAM: [LAND WHERE PATIENT LIVED MOST]

1. Kurinji (Hilly terrain)
2. Mullai (Forest range)
3. Marutham (Plains)
4. Neithal (Coastal belt)
5. Paalai (Arid regions)

3. KAALAM:

1. Kaar kaalam
2. Koothir kaalam
3. Munpani kaalam
4. Pinpani kaalam
5. Ilavenil kaalam
6. Muthuvenil kaalam

4. GUNAM:

1.Sathuvam 2.Raasatham 3.Thaamatham

5. IMPORIGAL (SENSORY ORGANS):

Normal/Affected

Mei ----------

Vaai ----------

Kann ----------

Mukku ----------

Sevi ----------

6. KANMENDHIRIYAM (MOTOR ORGANS):

Kai ----------

Kal ----------

Vaai ----------

Eruvai ----------

Karuvaai ----------

7. KOSANGAL (SHEATH):

Annamaya kosam ----------

Pranamaya kosam ----------

Manomaya kosam ----------

Vignana maya kosam ----------

Anandamaya kosam ----------

8. UYIR THAATHUKKAL: [THREE HUMORS] (VALI, AZHAL, IYAM)

A) VALI

Pranan _____

Abanan _____

Samanan _____

Uthanan _____

Vyanan _____

Naagan _____

Koorman _____

Kirukaran _____

Devathathan _____

Dhananjayan _____

B) AZHAL

Analakam _____

Ranjakam _____

Sathakam _____

Prasakam _____

Alosakam _____

C) IYAM

Avalambagam _____

Kilethagam _____

Pothagam _____

Tharpagam _____

Santhigam _____

9. SEVEN UDAL THATHUKKAL: (SEVEN SOMATIC COMPONENTS)

Saram _____

Senneer _____

Oon _____

Koluppu _____

Enbu _____

Moolai _____

Sronitham _____

10. ENVAGAI THERVU:

I. NAADI: [PULSE PERCEPTION]

II. SPARISAM: [PALPATION]

III. NAA: [TONGUE]

IV. NIRAM: [COMPLEXION]

1. Vadham
2. Pitham
3. Kabam

V. MOZHI: [VOICE]

1. High Pitched
2. Low Pitched
3. Medium Pitched

VI. VIZHI: [EYES]

VII. MALAM: [BOWEL HABITS / STOOLS]

Niram

Irugal

Ilagal

Others

VIII. MOOTHIRAM [URINE EXAMINATION]

NEERKKURI:

Niram

Manam

Edai

Nurai

Enjal

NEIKKURI:

Date:

Station:

Signature of the Guide **Signature of the Investigator**

GOVERNMENT SIDDHA MEDICAL COLLEGE

ARIGNAR ANNA GOVERNMENT HOSPITAL OF INDIAN MEDICINE

CHENNAI – 600 106

POST- GRADUATE DEPARTMENT OF KUZHANTHAI MARUTHUVAM

CLINICAL STUDY ON **"CHITRAMUTTI NEI"** IN THE TREATMENT OF **"PAANDU NOI'' (IRON DEFICIENCY ANAEMIA)**IN CHILDREN

FORM IV: LABORATORY INVESTIGATIONS PROFORMA

1. SERIAL NO. OF THE CASE: …….....

2.OP / IP NO: .....

3. NAME: …… 4.AGE: …… 5.GENDER: .....

A) BLOOD INVESTIGATIONS:

BLOOD INVESTIGATIONS		**BEFORE TREATMENT**	**AFTER TREATMENT**
Hb (gm/dL)			
T.RBC (millions cells/ Cu.mm)			
ESR (mm)	**½ hr.**		
	1 hr.		
T.WBC (Cells / Cu.mm)			
Differential Count (%)	**Polymorphs**		
	Lymphocytes		
	Monocytes		
	Eosinophils		
	Basophils		

BLOOD INVESTIGATIONS	BEFORE TREATMENT	AFTER TREATMENT
PCV		
MCV		
MCH		
MCHC		
SERUM IRON		
SERUM FERRITIN		
TIBC		

INVESTIGATIONS		BEFORE TREATMENT	AFTER TREATMENT
Motion	Ova		
	Cyst		

B) URINE INVESTIGATIONS:

URINE INVESTIGATIONS	BEFORE TREATMENT	AFTER TREATMENT
Albumin		
Sugar		
Deposits		

Date:

Station:

Signature of the Guide **Signature of the Investigator**

GOVERNMENT SIDDHA MEDICAL COLLEGE

ARIGNAR ANNA GOVERNMENT HOSPITAL OF INDIAN MEDICINE

CHENNAI – 600 106

CLINICAL STUDY ON **"CHITRAMUTTI NEI"** IN THE TREATMENT OF **"PAANDU NOI'' (IRON DEFICIENCY ANAEMIA)**IN CHILDREN

FORM V: INFORMED CONSENT FORM

"I have read the foregoing information, or it has been read to me. I have the opportunity to ask questions about it to my satisfaction.

I consent voluntarily to participate my child in this study and understand that I have the right to withdraw my child from the study at any time without in any way it affecting my child further medical care*".*

"I have received a copy of the information sheet/consent form".

Date:

Signature of the participant:

In case of illiterate participant

"I have witnessed the accurate reading of the consent form to the potential participant, and the individual has the opportunity to ask questions. I confirm that the individual has given consent freely*."*

Date:

Signature of a witness Left thumb Impression of the Participant

(Selected by the participant bearing no connection with the survey team)

Date:

Station:

Signature of participant:

Signature of the Guide **Signature of the Investigator:**

அரசு சித்த மருத்துவக் கல்லூரி, சென்னை-106

அறிஞர் அண்ணா மருத்துவமனை, சென்னை

பாண்டு நோய்க்கான சித்த மருந்தின் **(சிற்றாமுட்டி நெய்)**

பரிகரிப்புத் திறனைக் கண்டறியும் மருத்துவ ஆய்விற்கான தகவல் படிவம்ஒப்புதல் படிவம் ஆய்வாளரால் சான்றளிக்கப்பட்டது.

நான் இந்த ஆய்வை குறித்த அனைத்து விபரங்களையும் நோயாளிக்கு புரியும் வகையில் எடுத்துரைத்தேன் என உறுதியளிக்கிறேன்.

தேதி: கையொப்பம்:

இடம்: பெயர்:

நோயாளியின் பெற்றோர் ஒப்புதல் படிவம்

என்னிடம் இந்த மருத்துவ ஆய்வின் காரணத்தையும், மருந்தின் தன்மை மற்றும் மருத்துவ வழிமுறை பற்றியும், தொடர்ந்து எனது உடல் இயக்கத்தை கண்காணிக்கவும், அதனை பாதுகாக்கவும் பயன்படும் மருத்துவ ஆய்வுக்கூட பரிசோதனைகள் பற்றி திருப்தி அளிக்கும் வகையில் ஆய்வு மருத்துவரால் விளக்கிக் கூறப்பட்டது.

நான் எனது குழ்ந்தையின் இந்த மருத்துவ ஆய்வின் போது காரணம் எதுவும் கூறாமல், எப்பொழுது வேண்டுமானாலும இந்த ஆய்விலிருந்து எனது குழந்தையை விடுவித்து கொள்ளும் உரிமையை தெரிந்திருக்கின்றேன். நான் என்னுடைய சுதந்திரமாக தேர்வு செய்யும் உரிமையைக் கொண்டு நோய்க்கான சிற்றாமுட்டி நெய் மருந்தின் பரிகரிப்பும் திறனைக் கண்டறியும் மருத்துவ ஆய்விற்கு என்னை உட்படுத்த ஒப்புதல் அளிக்கிறேன்.

தேதி: கையொப்பம்:

இடம்: பெயர்:

தேதி: சாட்சிக்காரர் கையொப்பம்:

இடம்: பெயர்:

உறவுமுறை:

துறைத்தலைவர் கையொப்பம்: ஆராய்ச்சியாளர் கையொப்பம்:

GOVERNMENT SIDDHA MEDICAL COLLEGE, CHENNAI

CLINICAL STUDY ON **"CHITRAMUTTI NEI"** IN THE TREATMENT OF

"PAANDU NOI'' (IRON DEFICIENCY ANAEMIA) IN CHILDREN

FORM VI - WITHDRAWAL FORM

SI NO :

OP / IP NO :

NAME :

AGE / GENDER:

DATE OF TRIAL COMMENCEMENT :

DATE OF WITHDRAWAL FROM TRIAL :

REASONS FOR WITHDRAWAL:

- Long absence at reporting : Yes/ No
- Irregular treatment: Yes/ No
- Shift of locality : Yes/No
- Increase in severity of symptoms: Yes/No
- Development of severe adverse drug reactions: Yes/No

Date:

Station:

Signature of the Guide **Signature of the Investigator**

GOVERNMENT SIDDHA MEDICAL COLLEGE

ARIGNAR ANNA GOVERNMENT HOSPITAL OF INDIAN MEDICINE

CHENNAI – 600 106

CLINICAL STUDY ON **"CHITRA MUTTI"** IN THE TREATMENT OF **"PAANDU NOI'' (IRON DEFICIENCY ANAEMIA)** IN CHILDREN

FORM VII – PATIENT INFORMATION SHEET

Name of Co- Investigator: G.G. Kalaiselvi

Name of the college:

Govt. Siddha Medical College, Arumbakkam, Chennai-106.

INFORMATION SHEET FOR PATIENTS PARTICIPATING IN THE OPEN CLINICAL TRIAL.

I, G.G.Kalaiselvi studying M.D(Siddha) at Govt.Siddha Medical College, Chennai, is doing a clinical trial on ''PAANDU Noi" –Iron Deficiency Anaemia in children. It is becoming a most common disease, occurring throughout the world. In this regard, I am in need to ask you few questions. I will maintain confidentiality of your comments and data obtained. There will be no risk of disclosing your identity and no physical, psychological or professional risk is involved by taking part in this study. Taking part in this study is voluntary. No compensation will be paid to you for taking part in this study.

You can choose not to take part. You can choose not to answer a specific question. There is no specific benefit for you if you take part in the study. However, taking part in the study may be of benefit to the community, as it may help us to understand the problem of defaulters and potential solutions.

If you agree to be a participant in this study, you will be included in the study primarily by signing the consent form and then you will be given the internal medicine''Chitramutti Nei" (Internal medicine) 4-5 ml (B.D) for 28 days.

The information I am collecting in this study will remain between you and the Co- investigator (myself). I will ask you few questions through a questionnaire. I will not write your name on this form. I will use a code instead.

The questionnaire will take approximately 20 minutes of your time.

If you wish to find out more about this study before taking part, you can ask me all the questions you want or contact G.G.Kalaiselvi, PG Scholar cum Co-investigator of this study, attached to Govt. Siddha Medical College, Chennai-106. You can also contact the Member-secretary of Ethics committee, Govt. Siddha Medical College, Chennai.

அரசு சித்த மருத்துவக் கல்லூரி, சென்னை-106

அறிஞர் அண்ணா மருத்துவமனை, சென்னை

பாண்டு நோய்க்கான சித்த மருந்தின் **(சிற்றாமுட்டி நெய்)**

பரிகரிப்புத் திறனைக் கண்டறியும் மருத்துவ ஆய்விற்கான தகவல் படிவம்

ஆராய்ச்சியாளர் பெயர்: கோ.ஞா.கலைச்செல்வி

நிறுவனத்தின் பெயர்:அரசு சித்த மருத்துவக் கல்லூரி

அரும்பாக்கம், சென்னை-106

அரசு சித்த மருத்துவக் கல்லூரியில் பட்டமேற்படிப்பு பயின்று வரும் நான் மருத்துவர் கோ.ஞா.கலைச்செல்வி **பாண்டு** என்னும் நோயில் மருத்துவ ஆராய்ச்சியில் ஈடுபட்டுள்ளேன்.

இந்த நோய் உட்டச்சத்து குறைவினால் ஏற்படுகின்றன. இது பரவக் கூடிய நோயல்ல.

இந்த ஆராய்ச்சி சம்பந்தமாக சில கேள்விகளைக் கேட்கவும், தேவையான ஆய்வகப் பரிசோதனைக்கு தங்கள் குழந்தையை உட்படுத்தவும உள்ளேன்.

இந்த ஆராய்ச்சிக்கு தங்கள் விருப்பத்தின் பேரில் உட்படும் பட்சத்தில் உள்மருந்நாக சிற்றாமுட்டி நெய் 4-5 மிலி 2 வேளை (காலை, மாலை) உணவுக்கு பின் 28 நாட்கள் உட்கொள்ள வேண்டும். வெளிநோயாளர்கள் 7 நாட்களுக்கு ஒரு முறை வரவேண்டும்.

இந்த மருந்து சிறப்பாக பாண்டு நோய்க்காக அங்கீகரிக்கப்பட்ட சித்த மருத்துவ நூலில் கூறப்பட்டுள்ளது

இந்த ஆராய்ச்சியில் தங்களை அனுமதித்த பிறகு உங்களுக்கு விருப்பம் இல்லையெனில் எப்போது வேண்டுமானாலும் ஆராய்ச்சியில் இருந்து விலகிக் கொள்ள உரிமை உள்ளது.

இந்த ஆராய்ச்சிக்கு சம்பந்தமாக நோயின் தன்மை பற்றியும் மற்ற விபரங்களுக்கும் ஆராய்ச்சியாளர் மருத்துவர்: கோ.ஞா.கலைச்செல்வி (பட்டமேற்ப் படிப்பாளர், குழந்தை மருத்துவத் துறை) அவர்களை எந்த நேரத்திலும் தொடர்பு கொள்ளலாம். கைப்பேசி எண்: 9500738302.

மேலும் இந்த ஆராய்ச்சிக்கு தக்க அனுமதிச் சான்று (ஐநுஊ) பெறப்பட்டுள்ளது.

இந்த மருந்து முற்றிலும் பாதுகாப்பான மூலிகை பொருட்களைக் கொண்டு தயாரிக்கப்பட்டுள்ளது. பக்க விளைவுகளை ஏற்படுத்தாது. மேலும் உணவு முறையில் மருத்துவரால் கூறப்படும் பத்தியம் காக்குமாறு அறிவுறுத்தபடுகிறது.

இது சம்பதமான தங்களது அனைத்து விவரங்களும் ரகசியமாக வைக்கப்படும் என உறுதி அளிக்கிறேன்.

இதில் பயணப்படி முதலிய எந்த உதவித் தொகையும் வழங்கப்படமாட்டாது.

இந்த ஆராய்ச்சியின் போது உடலுக்கு வேறு பாதிப்பு ஏற்படும் பட்சத்தில் அறிஞர் அண்ணா மருத்துவமனையில், தக்க சிகிச்சை அளிக்கப்படும்.

GOVERNMENT SIDDHA MEDICAL COLLEGE

ARIGNAR ANNA GOVERNMENT HOSPITAL OF INDIAN MEDICINE

CHENNAI – 600 106

CLINICAL STUDY ON **"CHITRAMUTTI NEI"** IN THE TREATMENT OF **"PAANDU NOI'' (IRON DEFICIENCY ANAEMIA)**IN CHILDREN

FORM X - ADVERSE REACTION REPORTING FORM

SERIAL NO :

OP/IP NO :

NAME : AGE: GENDER:

DATE OF TRIAL COMMENCEMENT:

DATE OF OCCURRENCE OF THE ADVERSE REACTION:

TIME:

DESCRIPTION OF ADVERSE REACTION:

MANAGEMENT:

Date:

Station:

Signature of the Guide **Signature of the Investigator**

DEPARTMENT OF KUZHANTHAI MARUTHUVAM

DISSERTATION STUDY ON CHITRAMUTTI NEI IN

PAANDU NOI (IRON DEFICIENCY ANAEMIA)

INVESTIGATOR – Dr. G.G.KALAISELVI

ANNA HOSPITAL OPD- CHENNAI-106

OP.NO: **DATE:**

NAME:

AGE / SEX:

PARENT NAME:

ADDRESS:

PHONE NO:

COMPLAINTS & DURATION:

- Loss of appetite
- Fatigue
- Worm infestation
- Dyspnoea on exertion
- Pallor of skin and mucous membrane
- Lack of concentration

ECONOMIC STATE : POOR / MIDDLE / RICH

DIET : VEG / MIXED

H/O PICA :

FAMILY HISTORY :

PAST HISTORY :

ON EXAMINATION:

HT :

WT :

PALLOR :

CVS :

RS :

ENVAGAI THERVU:

NAA	:	MALAM	:
NIRAM	:	MOOTHIRAM	:
MOZHI	:	NAADI	:
VIZHI	:	SPARISM	:

INVESTIGATION:

	BEFORE	AFTER		BEFORE	AFTER
BLOOD			S.FERRITIN		
TC			TIBC		
DC			**URINE**		
ESR			Alb		
Hb			Sugar		
RBC			Dep		
PCV			**MOTION**		
MCV			OVA		
MCH			CYST		
MCHC					

TREATMENT:

WEEKS/ DATE	Pallor	Worm Infestation	Loss Of Appetite	Dyspnoea On Exertion	Fatigue	Lack Of Concentration
I.						
II.						
III.						
IV.						
V.						

GOVT SIDDHA MEDICAL COLLEGE AND HOSPITAL

CHENNAI

Branch -IV KUZHANTHAI MARUTHUVAM

PROFORMA OF CASE SHEET FOR PAANDU NOI

IP. No	:	Nationality	:
Name	:	Religion	:
Age	:	Date of Admission	:
Sex	:	Date of Discharge	:
Address	:	Diagnosis	:
Informant	:	Medical Officer	:

1. Complaints and duration :
2. History of present illness :
3. History of Past illness :
4. Antenatal history :
5. Birth history :
6. Neonatal history :
7. Developmental history :
8. Nutritional history :
9. Immunization history :
10. Family history :
11. Socio economic status :

General examination:

1. Appearance and posture :
2. Nutritional status :
3. Anaemia :
4. Cyanosis :
5. Clubbing :
6. Jaundice :

7. Lymphadenopathy :
8. Abdominal distension :
9. Pedal oedema :

Vital Signs:

1. Temperature :
2. Pulse rate :
3. Respiratory rate :
4. Heart rate :
5. Blood pressure :

Anthropometry

a. Height :

b. Weight :

c .Chest circumference :

SIDDHA ASPECTS

Nilam

1. Kurinji :
2. Mullai :
3. Marutham :
4. Neithal :
5. Paalai :

Paruvakalam

1. Kaar :
2. Koothir :
3. Munpani :
4. Pinpani :
5. Elavenil :
6. Muthuvenil :

Poripulangal

1. Mei :
2. Vai :
3. Kan :
4. Mooku :
5. Sevi :

Kanmenthiriyam

1. Kai :
2. Kaal :
3. Vaai :
4. Eruvai :
5. Karuvai :

Uyir thathukkal

Vadham

1. Praanan :
2. Abaanan :
3. Viyaanan :
4. Uthaanan :
5. Samaanan :
6. Naagan :
7. Koorman :
8. Kirukaran :
9. Devathathan :
10. Dhananjeyan :

Pitham

1. Analpitham :
2. Ranjagam :
3. Saadhagam :
4. Praasagam :
5. Aalosagam :

Kabam

1. Avalambagam :
2. Kiletham :
3. Pothagam :
4. Tharpagam :
5. Santhigam :

UdalKattugal

1. Saaram :
2. Senneer :
3. Oon :
4. Kozhuppu :
5. Enbu :
6. Moolai :
7. Sukkilam / Suronitham:

Envagai Thervugal

1. Naadi :
2. Sparisam :
3. Naa :
4. Niram :
5. Mozhi :
6. Vizhi :
7. Malam :
8. Moothiram :

MODERN ASPECTS

1. Respiratory System :
2. Cardiovascular system :
3. Gastro intestinal system :
4. Central nervous system :
5. Excretory system :

Laboratory investigations

Blood

TC :

DC :

ESR :

½ hr :

1 hr :

Hb% :

Urine

Albumin :

Sugar :

Deposits :

Stools

Ova :

Cyst :

Other Investigations

PCV:

MCV:

MCH:

MCHC:

Investigation - Siddha aspect

1. Neer kuri

Niram :

Edai :

Manam :

Nurai :

Enjal :

2. Neikuri

3. Daily progress

Date	**Symptoms**	**Medicine**

BIBLIOGRAPHY

SIDDHA BOOKS

- *K.S.Murugesa Mudaliar,Dr.Pon.Guru.Sironmani-Kuzhanthai Maruthuvam [Balavagadam]*
- *Dr.Moganaraj,Mathalai Nooi Thooguthi 1&2*
- *Chikicha Rathna Deepam* (Page No:212,213) Pub*: B.Rathina Nayakar And Sons,Chennai-79,Edition-2011*
- *Chikicha Rathna Deepam* Saraku Suthi Sai Muraigal
- *K.S.Murugesa Mudaliar -Gunapadam Mooligai Vaguppu*
- *R.Thiyagarajan-Gunapadam Thathu Seeva Vaguppu*
- *Agathiyar Gunavagadam*
- *Kannusaami Parambarai Vaithiyam*
- *Kannusami Pillai,Materia Medica*
- *Dr .M.Shanmugavelu,.Noi Naadal Noi Muthanaadal Thirattu Part-I*
- *T.V.Sambasivampillai'stamil English Dictionary,Vol.1 To 5*
- *Thanvandhiri Kuzhanthai Vaagadam*
- *S. Somasundaram-Maruthuva Thavaraviyal*
- *Kannusami Pillai,Sikicharathna Deepam Ennum Vaithiya Nool.*
- *Noigalukku Siddha Parigaram*
- *Thirumoolar Thirumanthiram*
- *Sarabaendhirar vaithiya muraigal.*

MODERN BOOKS

- *Dr.K.N.Natkarni Indian Materia Medica.*
- *Sembulingam Human Physiology*
- *Nelson Textbook Of Pediatrics*
- *O.P.Ghai,Essential Pediatrics.*
- *Aruchamy Lakshmanasamy Clinical Paediatrics*
- *Davidson,Davidson'sscaling Principies And Practice Of Medicine.*
- *Robbins-Robbins Pathologic Basis Of Disease.*
- *India Pharmacopeia I Volume I, Government of India, Ministry of Health and Family welfare, Indian Pharmacopeia commission, 2014.*
- *Pharmacopoeial Laboratory for Indian Medicine (PLIM) Guideline for standardization and evaluation of indian medicine which include drugs of*

Ayurveda, Unani and Siddha systems. Department AYUSH .Ministry of Health & Family Welfare, Govt. of India

- *Indian standard methods of sampling and test for oils and fats Indian standard institution New Delhi 47-50. 1964*
- *Brain KR, Turner TD. The Practical Evaluation of Phytopharmaceuticals. Bristol:Wright- Scientechnica; 1975:36-45*
- *Lukasz Komsta, Monika Waksmundzka-Hajnos, Joseph Sherma . Thin Layer Chromatography in Drug Analysis .CRC Press, Taylor and Francis.*
- *Smille TJ and Khan IA, A Comprehensive approach to Identifying and authenticating Botanical Products, Clinical Pharmacology and therapeutics. 2010; 87(2): 175-186.*
- *Limmatvapirat CJ, Charoenteeraboon, Phaechamud T. Simultaneous analysis of eleven heavy metals in extracts of Sonneratiacaseolaris (L.) Engl. By ICP-MS. Res. J. Pharm., Biol. Chem.Sci.2012; 3:744-50.*
- *OECD Guideline for testing of Chemicals (2001) Guideline 423: Acute Oral Toxicity-Acute Toxic Class Method.*
- *OECD Guide lines 407 for testing of chemicals. Repeated dose 28-Day Oral Toxicity Study in Rodents. 2008: pp 2- 8.*
- *Jain N, Sharma P, Sharma N, Joshi S C. Haemato-biochemical profile following sub acute toxicity of malathion in male albino rats. Pharmacologyonline. 2009;2:500–506.*
- *Suvarna, S.K., C.Layton and J.D. Bancroft. 2013. Bancroft's theory and practice of histological techniques. 7th edn, Churchill Livingstone, London*
- *Das SS, Dey M, Ghosh AK. Determination of anthelmintic activity of the leaf and bark extract of tamarindusindicalinn. Indian J Pharm Sci. 2011 Jan;73(1):104-7*

9. ANNEXURE-I

CERTIFICATES

The Tamil Nadu Dr.M.G.R.Medical University

69,Anna Salai,Guindy,Chennai - 600 032.

This Certificate is awarded to Dr/Mr/Mrs.....G.i.G.i..kalaiselvi.....

for participating as ~~Resource Person~~ / Delegate in the Eighteenth Workshop on

" RESEARCH METHODOLOGY & BIOSTATISTICS "

FOR AYUSH POST GRADUATES & RESEARCHERS

Organized by the Department of Siddha

The Tamil Nadu Dr. M.G.R. Medical University from 20 th to 24 th July 2015.

Dr.N.KABILAN, M.D.(Siddha)
READER,DEPT.OF SIDDHA

Prof. **Dr.P.ARUMUGAM,** M.D.,
REGISTRAR i/c

Prof. **Dr.D.SHANTHARAM,** M.D., D.Diab.,
VICE - CHANCELLOR

GOVERNMENT SIDDHA MEDICAL COLLEGE
Arumbakkam, Chennai-106

Communication Of The Decision Of Institutional Ethics Committee (IEC) DATE : 26/3/15

IEC No: GSMC-CH-ME-4/019/2015

Protocol title: AN OPEN CLINICAL STUDY ON "PANDU NOI" (IRON DEFICIENCY ANAEMIA)IN CHILDREN WITH SIDDHA TRIAL DRUGS "CHITRAMUTTI NEI"(INT).
Principal Investigator: Dr. G.G.KALAISELVI
Name & Address of Institution: Government Siddha Medical College, Arumbakkam, Chennai-106
☑ New Review ☐ Revised Review ☐ Expedited Review
Date of review (DD/MM/YY) : 26.03.2015 Date Of Previous Review, If Revised Application:
Decision of the IEC ☑ Recommended ☐ Recommended with suggestions ☐ Revision ☐ Rejected
Suggestions / Reasons / Remarks: Dosage of medicine is 5.ml & duration - 28 Days. Remove haematinic action from pharmacological study.
Recommended for a period of 1 year from date of completion of preclinical studies :

Please Note:

- Inform IEC immediately in case of any adverse events/serious drug reaction.
- Seek IECapproval in case of any change in the study procedure, site and investigator
- This approval is valid only for period mentioned above
- IEC member have the right to review the trial with prior intimat on.

26/3/15

Dr.P.Jeyaprakashnarayanan
Chairman

Dr.V.Banumathi
Member Secretary

INSTITUTIONAL ETHICS COMMITTEE

Date:

Sub: EC review of research proposals.

Ref: Your letter dated

MEMBERS	PARTICIPATION	SIGNATURE
DR.P.JEYAPRAKASH NARAYANAN M.D(S)., Chairman		
DR.V.BANUMATHI M.D(S)., Member Secretary		20/03/15
DR.N.KABILAN M.D(S)., Clinician- Siddha	✓	26/3/15
DR.P.SATHIYA RAJESWARAN M.D(S)., Clinician- Siddha	✓	26/3/15
DR.G.AADINAAATH REDDY,M.Pharm, Ph.D., Pharmacologist	✓	20/03/15
DR.S.THILAGAVATHY Msc.,Ph.D., Social Scientist	✓	24/3/15
DR.T.MAHALAKSHMI M.A.,Ph.D., Linguistic Expert	✓	26.03
DR.P.VIDYA M.B.B.S., DMRD., Modern Medicine Expert	✓	26/3/15
MR.P.SARAVANAN., Puplic Person	✓	

20/3/15

Dr.P.Jeyaprakashnarayanan
Chairman

Dr.V.Banumathi
Member Secretary

CERTIFICATE

This is to certify that the project entitled "**ACUTE AND SUB-ACUTE TOXICITY EVALUATION OF CHITRAMUTTI NEI IN RATS.**" has been approved by the Institutional Animal Ethics Committee of Sathyabama University, Chennai.

IAEC Approval No.: **SU/CLATR/IAEC/VII/042/2016**

Principal Investigator: Dr. G. G.Kalaiselvi

Animal Sanctioned: *Ratius norvegicus* / Wistar albino rats

Female: 12; Male:6; Total: 18 (Eighteen)

Date: 05.10.2016

DR. R. SELVARAJ
Member Secretary

DR.R.ILAVARASAN
CPCSEA Nominee

Noble research solutions
We Trust in Quality and Ethics

Noble Research Solutions

We Trust in Quality and Ethics

E-mail: nobleresearchsolutions@gmail.com
Contact: 9710437419, Admin: 044 - 42691289

Date: 29.03.2017

To,

Dr.G.G.Kalaiselvi
Govt Siddha Medical College,
Arumbakkam, Chennai, Tamil Nadu 600106

Project Id : **NRS/AS/0018/01/2017**

This is to certify that Dr.G.G.Kalaiselvi from Govt Siddha Medical College, Arumbakkam, Chennai, has carried out the following activity at our facility for the trial drug *Chitramutti Nei (CN)*

S.No	Study Description	Annexure no
1.	Standardization and Physicochemical Evaluation of study drug *Chitramutti Nei (CN)*	I
2.	Anti-Microbial Profiling of trial drug *Chitramutti Nei (CN)*	II
3.	Evaluation of anthelmintic Property of the trial drug *Chitramutti Nei (CN)*	III

Note:

- *Annexures was attached as a separate enclosure along with this report.*

NOBLE RESEARCH SOLUTIONS TAMIL NADU, INDIA. CHENNAI

सिद्ध केंद्रीय अनुसन्धान संस्थान

(सी.सी.आर.एस., चेन्नई, आयुष मंत्रालय, भारत सरकार)

अण्णा सरकारी अस्पताल परिसर, अरुम्बाक्कम, चेन्नई - 600106

SIDDHA CENTRAL RESEARCH INSTITUTE

(Central Council for Research in Siddha, Chennai,
Ministry of AYUSH, Government of India)
Anna Govt. Hospital Campus, Arumbakkam, Chennai - 600106
E-mail: crisiddha@gmail.com Phone: 044-26214925, 26214809

24th May 2016

CERTIFICATE

Certified that the plant/drugs submitted for identification by Dr. G.G. Kalaiselvi, PG 2nd year, Department of Kuzhanthai maruthuvam, Government Siddha Medical College, Arumbakkam, Chennai - 600 106, are identified as

1. Thanrikai thol	-	*Terminalia bellirica* (Gaertn.) Roxb. (Pericarp)
2. Nilavembu	-	*Andrographis paniculata* (Burm.f.) Nees (Aerial portion)
3. Nelli vatral	-	*Phyllanthus emblica* L. (Pericarp)
4. Kari manjal	-	*Curcuma longa* L. (Rhizome)
5. Kadukkai thol	-	*Terminalia chebula* Retz. (Pericarp)
6. Iluppai verpattai	-	*Madhuca longifolia* (J. Koen. ex L.) J.F. Macbr. (Rootbark)
7. Chitramutti ver	-	*Sida cordifolia* Linn. (Root)

Sasikala Ethirajulu

Sasikala Ethirajulu
Consultant (Pharmacognosy)

24/5/16

P.Sathiyarajeswaran
Assistant Director Incharge

Noble research solutions
We Trust in Quality and Ethics

Noble Research Solutions

We Trust in Quality and Ethics

E-mail: nobleresearchsolutions@gmail.com
Contact: 9710437419, Admin: 044 - 42691289

Issued to : Dr.G.G.KALAISELVI

Date: 29/3/2017

- **Heavy Metal Analysis Report of Chitramutti Nei**

Element	Concentration (mg/L)	Upper Limit (mg/L)
Cadmium (Cd)	BDL	0.299

- **Preliminary Phytochemical Evaluation Report of Chitramutti Nei**

PHYTOCOMPONENTS	CN
ALKALOIDS	-
FLAVONOIDS	-
GLYCOSIDES	+
STEROIDS	-
CARBOHYDRATES	+
TRITEREPNOIDS	-
COUMARINS	+
PHENOLS	+
CARDIAC GLYCOSIDES	-
TANNINS	-
SAPONINS	-
PROTEINS	-
ANTHOCYANIN	-
BETACYANIN	-
QUINONES	-

\+ Indicates positive

\- Indicates Negative

NOBLE RESEARCH SOLUTIONS TAMIL NADU INDIA CHENNAI

Noble research solutions
We Trust in Quality and Ethics

Noble Research Solutions

We Trust in Quality and Ethics

E-mail: nobleresearchsolutions@gmail.com
Contact: 9710437419, Admin: 044 - 42691289

Issued to : Dr.G.G.KALAISELVI
Purpose : Physicochemical Analysis
Project ID : NRS/AS/0018/01/2017
Formulation : Chitramutti Nei
Protocol : As per PLIM Guideline

Date: 29/3/2017

- **Organoleptic Evaluation Report of Chitramutti Nei**

Parameter	Observation
Color	Dark Yellowish
Smell	Pleasant
Touch	Greasy
Appearance	Clear After Melting

- **Physicochemical Evaluation Report of Chitramutti Nei**

S.No	Specific Test	Chitramutti Nei
1.	Specific Gravity	1.016
2.	Viscosity at 50°C (Pa s)	11.55
3.	Refractive index	1.44
4.	Weight per ml (gm/ml)	1.02
5.	Iodoine value (mg I2/g)	120.65
6.	Saponification Value (mg of KOH to saponify 1gm of fat)	282.04
7.	Total Iron content (mg/ml)	0.512
8.	*Loss on Drying at 105 °C (%)*	3.66 ± 1.22
9.	*Total Ash (%,*	2.11 ± 0.50
10.	*pH*	5

NOBLE RESEARCH SOLUTIONS TAMIL NADU INDIA CHENNAI

HISTO PATHOLOGY REPORT

BRAIN

Arrangement of the neurons appears intact with no sings of degeneration or apoptotic changes were observed in sample belongs to group I,II and III.

HEART

Appearance of myocyte was normal. Myocardial tissue appears normal with orderly striated heart muscle fibers and a clear nuclear and muscle bands were observed in samples belongs to group I, II and III.

LUNG

Lung parenchyma appears normal with regular arrangement of alveoli and alveolar sac with no signs of lymphocyte infiltration and pulmonary fibrosis were observed in both control and treated rats.

STOMACH

The continuity of mucosa was normal with no evidence of ulceration. Mucosal wall appears normal with regular arrangement of connective tissue were observed in sample belongs to group I, II and III.

LIVER

The centrilobularhepatocytes appears normal with stained cytoplasm. Appearance of portal vein, bile duct and hepatic artery was normal in sample belongs to group I, II and III.

SPLEEN

Erythropoietic cells (EP) are scattered throughout the red pulp of both the samples. No abnormalities found in lymph nodes of sample belongs to group I, II and III.

KIDNEY

Lumen of vessels and bowman’s space appears normal. No evidence of interstitial inflammation and lymphocyte accumulation were observed in in sample belongs to group I,II and III.

TESTES

Normal sertoli cell aligned properly on the basement membrane with oval dome shaped nucleus shows the normal morphology of the seminiferous tubule were observed in sample belongs to group I,II and III.

UTERUS

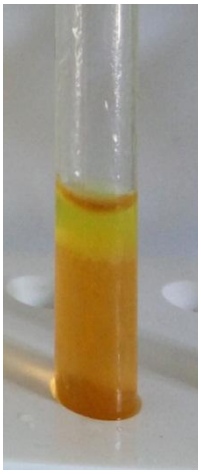
Appearance of endometrium, myometrium and uterine glands was normal. Arrangement of stratum basale, functionale and surface epithelium seems normal in samples belongs to group I,II and III.

OVARY

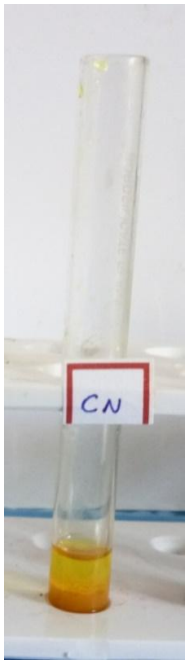
Histopathological analysis of ovary showing normal corpus luteum (CL) and Primordial follicles with few mature ovarian follicles with no signs of abnormality. Appearance of antral follicle, primary oocyte and secondary follicles are normal in sample belong to group I,II and III.

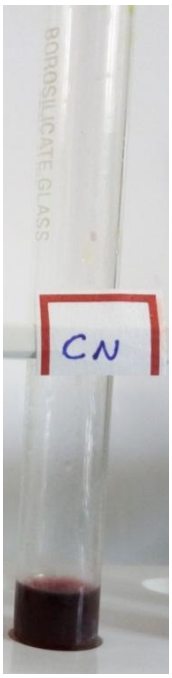
RESULTS

Test for Alkaloids **Test for CoumarinsTest for Saponins**

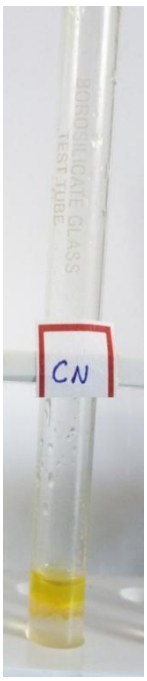


Test for Tanins **Test for Glycosides** **Test for Flavonoids**

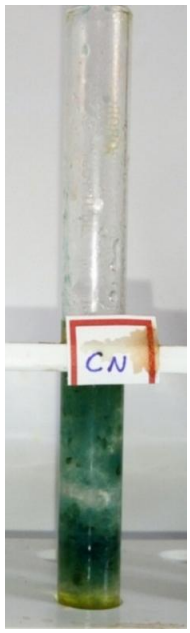




Test for Phenols **Test for Cardiac Glycosides** **Test for Steroids** **Test for carbohydrate**

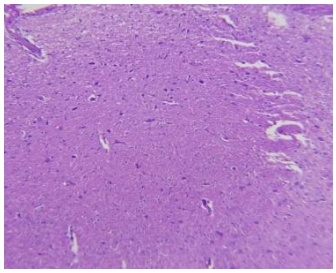
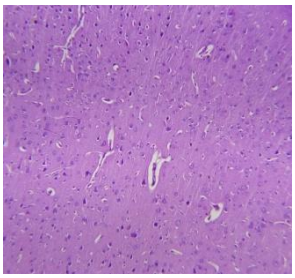
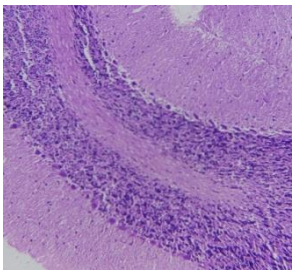
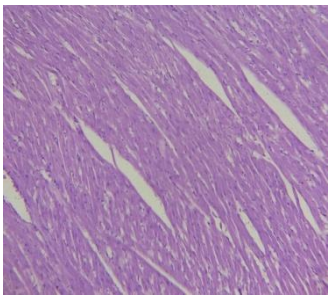
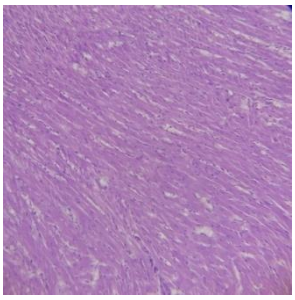
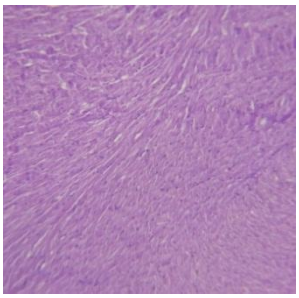
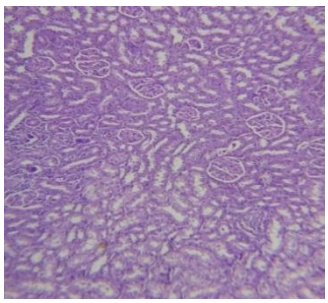
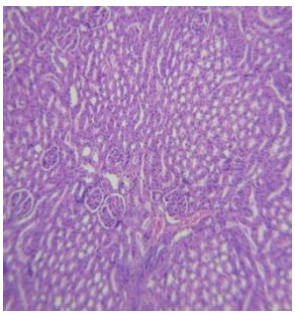
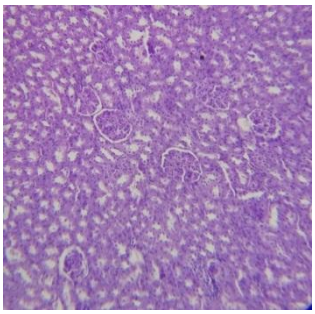
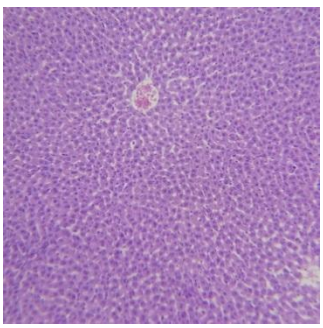
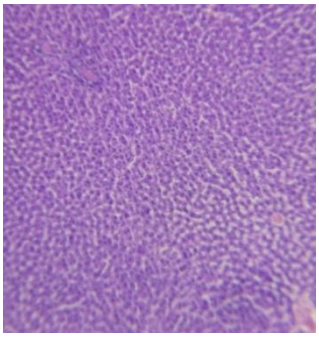
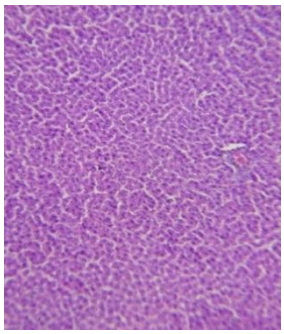


Test for Terpenoids **Test for Quinones** **Test for Proteins** **Test for Anthocyanins**



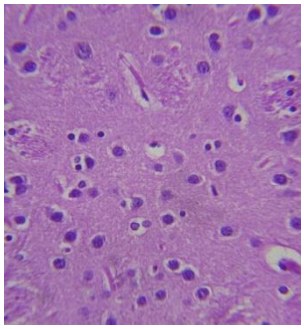
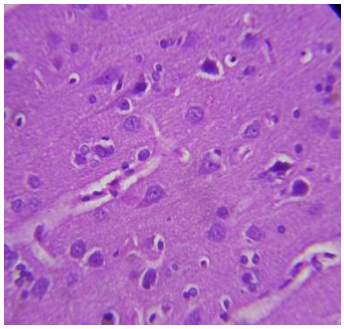
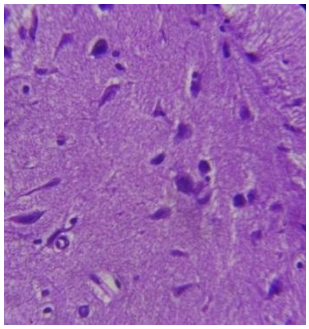
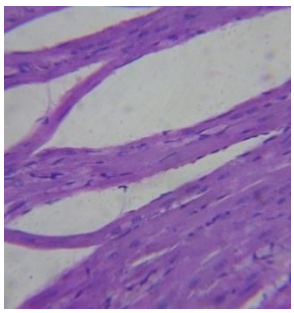
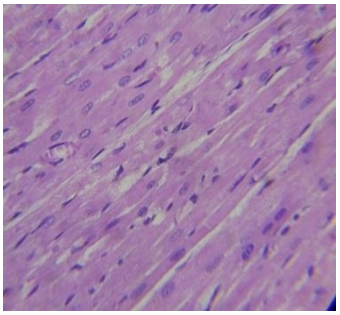
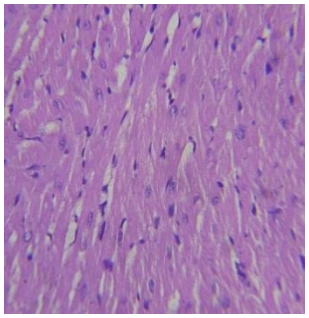
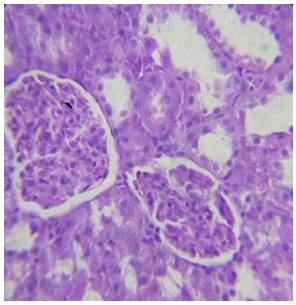
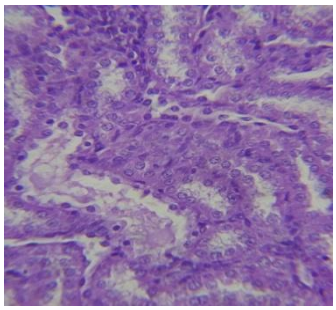
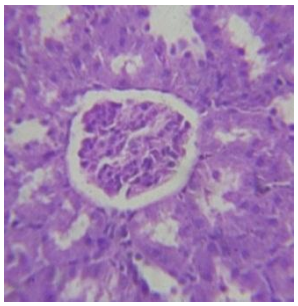
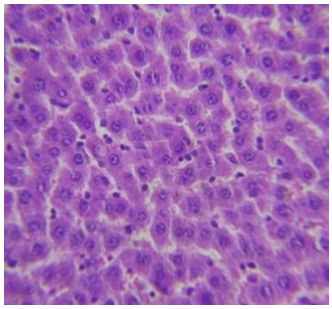
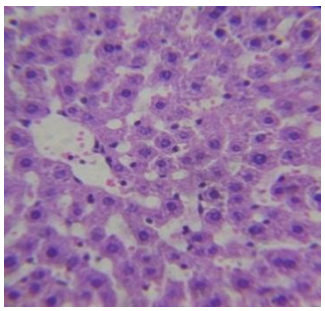
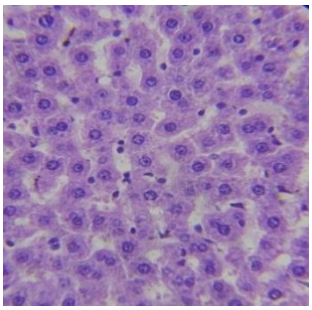
Histopathological analysis (Female Rat) in Sub-acute toxicity Study

Low Power Magnification 10X

	Group I	Group II	Group III
Brain			
Heart			
Kidney			
Liver			

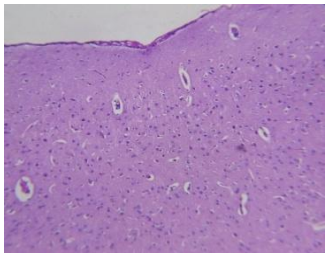
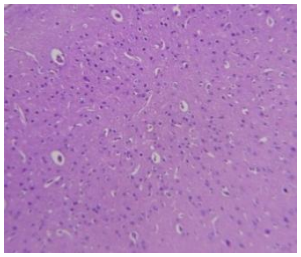
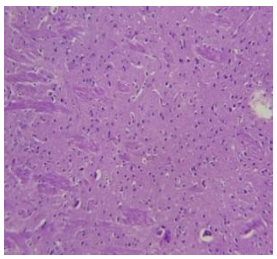
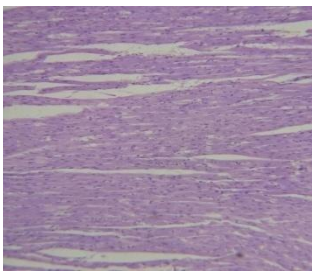
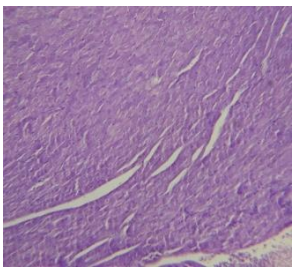
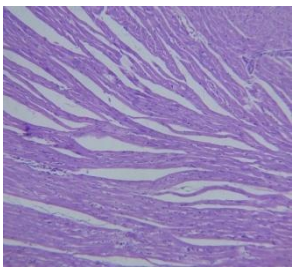
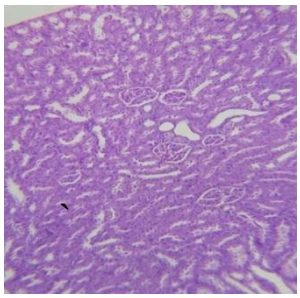
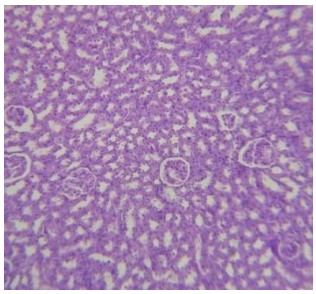
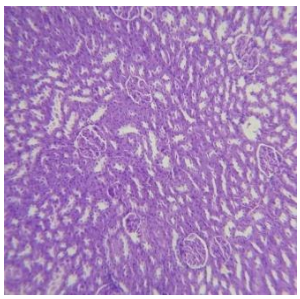
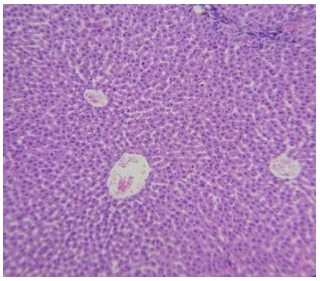
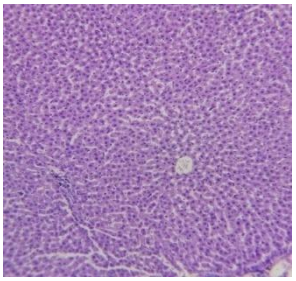
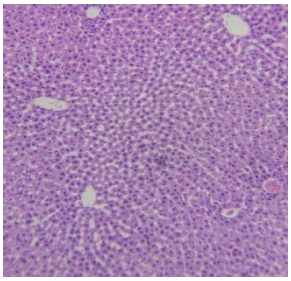
Histopathological analysis (Female Rat) in Sub-acute toxicity Study

High Power Magnification 40X

	Group I	Group II	Group III
Brain			
Heart			
Kidney			
Liver			

Histopathological analysis (Male Rat) in Sub-acute toxicity Study

Low Power Magnification 10X

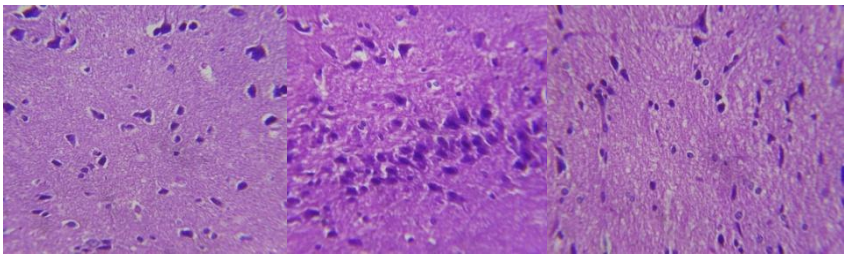
	Group I	Group II	Group III
Brain			
Heart			
Kidney			
Liver			

Histopathological analysis (Male Rat) in Sub-acute toxicity Study

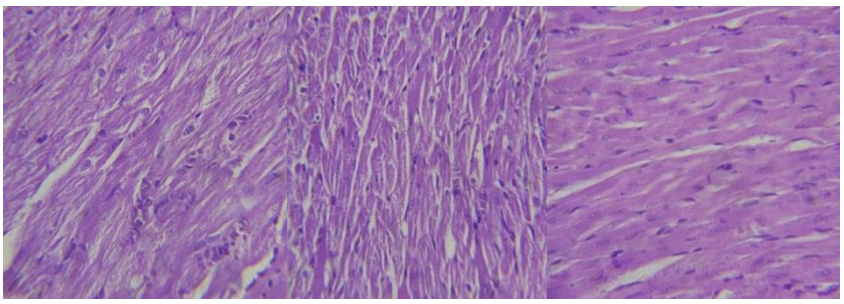
High Power Magnification 40X

Group I Group II Group III

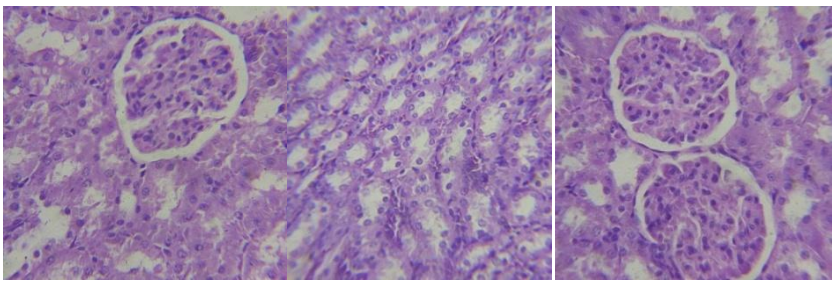
Brain



Heart



Kidney



Liver